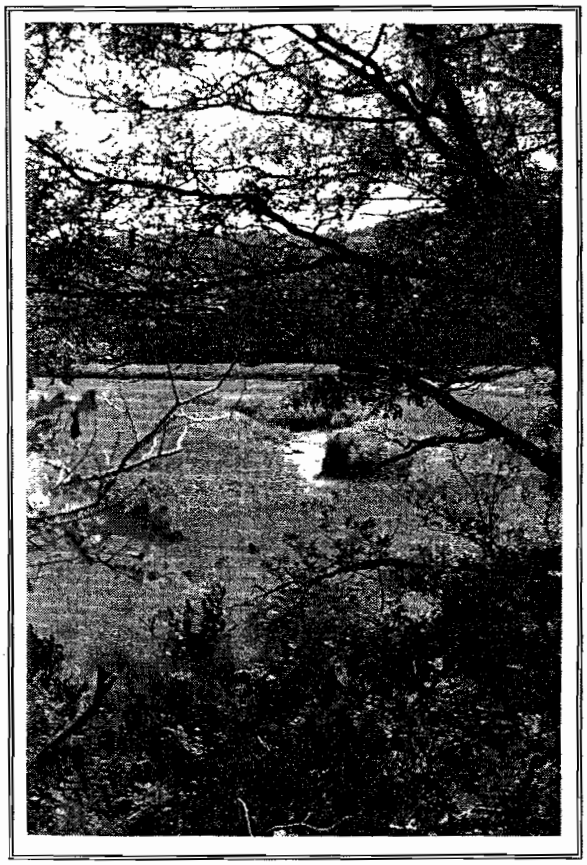
INVENTORY OF NATURAL RESOURCES AND LAND USE IN THE WEYMOUTH BACK RIVER ACEC



SUBMITTED TO THE WEYMOUTH BACK RIVER COMMITTEE
by Jennifer Myers, Intern to the Back River Committee

MARCH 1997

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INRODUCTION

Weymouth Back River Area of Critical Environmental Concern (ACEC)

The Weymouth Back River ACEC is located in the towns of Hingham and Weymouth approximately 15 miles south of Boston just west of Hingham Harbor and Hewitt's Cove. The Back River is bisected by the town boundary between Hingham on the east and Weymouth on the west. Technically speaking, the river begins at Herring Brook and includes the waters just north of the Route 3A bridge which flow out into Hingham Bay. The ACEC boundary however, is from the Route 3A bridge south along the river and up Herring Brook to the last fish ladder at Whitman's Pond (Figure 1).

The Weymouth Back River ACEC comprises approximately 950 acres in Hingham and Weymouth. It is an unusual natural area in the midst of an urban/suburban environment, uniquely preserved considering its proximity to Boston. Approximately 180 acres are tidal waters flushing into Hingham Bay. There are productive clam flats and nursery and feeding areas for a wide variety of finfish. Herring Brook in Weymouth provides annual passage to Whitman's Pond for thousands of alewives, locally referred to as herring. The Fresh River and several unnamed tributaries provide spawning sites for an annual smelt run. More than 100 acres of salt marsh and several salt ponds are vital links to the marine food web. Also included in the ACEC are ponds and swamps that form the headwaters of various tributaries to the Weymouth Back River. The ACEC boundary area generally follows the boundaries of the following open space and marine areas: The Weymouth Back River estuary, Bare Cove Park, Great Esker Park, More-Brewer Park, Bouve Pond and Herring Brook.

The significant resource areas within the ACEC include anadromous and catadromous fish runs, fish spawning and nursery areas, an estuary with over 200 acres of open water, flood plains, over 100 acres of salt marsh, several salt ponds, and over 100 acres of productive clam flats. Within the ACEC, habitat is available for many forms of wildlife, particularly birds. There are also several important historic sites and many scenic vistas.

Resource Significance

The document designating the Weymouth Back River as an ACEC in 1982 identified the following interests in support of the nomination of the Weymouth Back River for protection under the ACEC program. It is useful to review them for the resource management plan, as they set up the context for management planning and implementation in the estuary:

> (1) Quality of the Natural Characteristics - The expanses of marshland and the eskers act as a buffer against the activity of surrounding residential, commercial, and industrial areas. They also provide habitat for wildlife and opportunities for passive recreation. The size and scope of the eskers are unique in Massachusetts. Each year thousands of alewives and smelt pass through the estuary and spawn in the tributaries and headwaters.

WEYMOUTH BACK RIVER ACEC

ACEC Boundary Map

FIGURE 1

Legend

ACEC BOUNDARY ——

(Designated September 22, 1982)

Basemap: Weymouth, MA (1971, photorevised 1979) and Hull, MA (1971) 1:25,000-scale metric USGS topographic map.

ACEC Program, Department of Environmental Management, 100 Cambridge Street, Boston, MA 02202, (617)-727-3160.

(2) Productivity - The high productivity of the estuarine/saltmarsh ecosystems has been well documented in the scientific literature. The plant growth within the marsh is exported by the tides and ultimately incorporated into the marine food web. The protected, shallow waters of the estuary act as a nursery to shellfish and finfish and the relatively high water quality of the tributaries and the headwaters provides spawning sites for anadromous fishes.

(3) Uniqueness of the Area - The Back River estuary has remained relatively unchanged while located in the state's largest metropolitan area (within a 45 minute drive of over 1 million people) makes it truly unique to the region. The eskers are remarkable both for their size and state of preservation. The Massachusetts Division of Marine Fisheries lists the Back River as a major anadromous fish run, particularly notable considering the urban setting.

(4) Irreversibility of Impact - The upper reaches of the Back River, designated an ACEC, are defined by a shallow basin with a narrow downstream opening under the Route 3A bridge. This portion of the estuary, therefore, is susceptible to problems due to inadequate flushing. Discharge of pollutants or changes in bottom topography within the ACEC could have major impacts on fin and shellfish. Alterations in water quality or quantity or in bottom features could permanently impact alewife and smelt runs and spawning.

(5) Imminence of Threat to the Resources - Alterations that could impact resources of the ACEC have been proposed in the recent past. This designation will focus attention on the value and sensitivity of the area and will serve as a guide regarding future activity in the area (Weymouth Back River Designation Document 1982).

An ACEC designation requires higher standards of review by state agencies of certain proposed activities and encourages coordination of programs, plans and activities to achieve the goals of the designation. The designation highlights the importance of the estuary's resources and focuses attention on issues of resource values, function, degradation and use. The designation of the ACEC, accompanied by a resource management plan, provides the opportunity and framework for protecting and enhancing the natural resource and human use values of the estuary.

Purpose

An ACEC resource management plan is a collaborative effort between the agencies of the Executive Office of Environmental Affairs (EOEA) and municipalities, environmental and community groups and organizations, local businesses and residents, and other interested parties. A resource management plan is meant to develop goals and implementation plans for the preservation, restoration, enhancement, use or management of the resources of an ACEC. The resource management plan is meant to be an evolving document. It sets up a structure for on-going implementation and includes mechanisms for evaluating and amending the document.

Preliminary Goals

From the November 29, 1995 meeting of the Back River Committee/ACEC Resource Management Plan Sub-Committee were suggested for the Back River Resource Management Planning Effort.

Surface Waters and Water Quality

Goal: Protect and improve the water quality conditions of the Back River estuary.

Objectives:

- Restore the river to its natural state, free from pollution.
- Identify and clean up pollution sources.
- Participate in greater watershed planning.
- Establish a watershed association.

Estuarine and Freshwater Wetlands

Goal: Preserve, protect and restore the saltmarsh and wetlands in the Back River estuary.

Habitat Resources

Goal: Preserve, protect and restore the fisheries, shellfish beds and wildlife habitat in the Back River estuary.

Objectives:

- Open clam beds and keep them open.
- Preserve and protect the Herring run.
- Protect and enhance anadromous fish runs and habitat for salt water species.
- Protect the osprey nests and all native and migratory species in addition to permanent and introduced non-native species.
- Determine if restoration measures need to be taken.

Historical and Archeological Resources

Goal: Preserve, protect, enhance and restore historic and anthropological sites in the Back River estuary.

Special Use Areas

Goal: Protect, enhance and increase publically-owned open space in the estuary for its value as recreational and educational resources.

Objectives:

- Enhance educational and interpretive opportunities.
- Promote public awareness and public access.

Land Use and Regulations

Goal: Encourage appropriate land and water uses and regulatory control that is compatible with sound resource protection and the management objectives.

Objectives:

- Identify and evaluate impact of old and new landfills.
- Evaluate the zoning in both towns.
- Identify conflicting issues.

Background

Procedures Leading to ACEC Designation

Geographical areas that contain four or more of the following features may be nominated by legislators, citizens, municipal or state agencies or the governor for designation as an ACEC: fisheries, coastal geologic features, salt and fresh water wetlands, surface waters and water supplies, natural hazard areas, historical and archaeological resources, wildlife habitat, and special use areas such as public recreation areas. A decision by the Secretary of Environmental Affairs to designate an area as an ACEC carries with it a requirement that all state environmental agencies acquire information about the resources of the ACEC; preserve, restore or enhance the resources of the area; and ensure that activities within the ACEC minimize adverse effects on the natural and cultural values of the designated area.

Initial consideration of ACEC status for the area designated began in September of 1981 during a review of various environmental protection techniques by the Back River Committee. This group met several times with staff of the Massachusetts (MCZM) office. Subsequent informal meetings were held between MCZM, the Back River Committee, Boards of Selectmen, Planning Boards and Conservation Commissions of the two towns to explain the ACEC program and ramifications of such a designation. The ACEC was designated September 10, 1982 by the Secretary of Environmental Affairs, John Bewick. Mary Toomey, the Chairperson of the Back River Committee at that time, received the designation certificate from Secretary Bewick.

Since the time of the designation and up until the present, the Back River Committee has been involved with the general stewardship and management of the Back River ACEC, including land acquisition and clean-up. At the suggestion of Dr. Mary Sears from the Woods Hole Oceanographic Institute, Mary Toomey began working with the towns of Hingham and Weymouth to acquire the uplands surrounding the Back River as public open space, to identify and clean-up the pollution sources on the river and to involve the local private businesses and organizations in the process. Mary Toomey's work began in 1966 with the town of Weymouth's purchase of what is now Great Esker Park. Bare Cove Park was acquired next, and Mary Toomey has since been at the forefront of the land acquisition process which has been crucial in preserving the Back River for future generations. In total, Mary Toomey and the Back River Committee have organized the acquisition of seven separate pieces of land in the area, which have been acquired as public open space specifically for preserving the Back River.

INVENTORY

Natural Resources

Surface Waters and Water Quality

Estuaries

Estuaries are semi-enclosed coastal bodies of water in which the ocean water is significantly diluted by fresh water from land runoff. Based on a geomorphologic or land form characteristic classification type, the Weymouth Back River is considered a coastal plain estuary (Beal 1982). Coastal plain estuaries were formed as the rising sea level caused the oceans to invade the existing river valleys. These estuaries are sometimes referred to as drowned river valleys (Thurman 1978).

Based on the Stommel Water Mixing Method for categorizing estuaries, the Back River is a vertically mixed estuary. The Stommel Method takes into consideration the degree and physical properties of ocean and fresh water mixing for classifying an estuary (Beal 1982). A vertically mixed estuary is one where the net flow always proceeds from the river at the head of the estuary toward the mouth. Salinity at any point in the estuary will be uniform from the surface to the bottom due to the even mixing of the river water with ocean water by eddy diffusion at all depths. Salinity increases from the head to the mouth of the estuary (Thurman 1978).

The mixing patterns described often cannot be applied to an estuary as a whole. Mixing within an estuary may change with longitudinal distance, season or even tidal conditions. Understanding the dynamics of estuarine circulation is essential if desired advances are to be made in our ability to meaningfully describe: (1) parameters of water quality such as dissolved oxygen and coliform bacteria, (2) suspended particulate matter and bottom sediment transport, and (3) biological activity, particularly in relation to microscopic plants and animals and fish and egg and larvae (Thurman 1978).

Approximately 50% of the Weymouth Back River is an intertidal area, exposed at low tide and submerged at high tide. Most of this intertidal area is located toward the head of the Back River where the Herring Brook, Fresh River and Tucker's Swamp Brook empty into the salt marsh. The remaining portion of the Back River ranges from 0-6 feet bordering the intertidal area, to 6-18 feet in the middle of the river north of the ammunition dock extending to the mouth at Hingham Bay. One small area in front of the ammunition dock reaches to a depth of thirty feet and that was originally dreged out by the federal government.

Water Quality Information

Water supplies in the ACEC include the northern tip of a medium-yield aquifer which abuts the ACEC along the western edges of Bouve and Brewer Ponds. Bare Cove Park is serviced by the Massachusetts American Water Company. However, two private wells exist in the vicinity of the ACEC, one on private property of the Music Conservatory and one in Bare Cove Park for the

Model Railroad (U.S. Army corps).

The Department of Environmental Quality Engineering (DEQE) first sampled the Weymouth Back River area between 1975-1987, according to the Division of Marine Fisheries (DMF)(Yashura 1996). At this time, the area was classified as Restricted to shellfishing. As of July 1988, the classification was downgraded to Prohibited due to inconsistency of water quality and the shellstock not meeting the standards required for the depuration process. DMF began looking at the area again in 1992 (the primary pollution source on the Back River, the Stodder's Neck pumping station was repaired in 1992), and in earnest in 1995.

There are often elevated fecal counts in the Back River (fecal coliform bacteria counts are used as a measure of water quality in shellfish growing areas, see Habitat Resources for more detail) after a significant amount of rainfall. Rain washes pollutants on land which would otherwise not affect water quality, into nearby water bodies which results in contaminated marine life. This correlation is reflected in the DMF policy of automatic closure after rain. If there is between .5-.99 inches of rainfall the shellfish beds are automatically closed for three days. If it rains 1-1.9 inches there is a 5-day closure. If it rains more than 2 inches, the shellfish beds are closed until further notice or sampling can be done.

FECAL COUNT

DATE	AVERAGE TEMPERATURE	AVERAGE SALINITY	PURITAN STREET	FRESH RIVER STREET	HERRING RUN	WHALE ST. CREEK	LAST RAIN AMOUNT
7/8/91	72	27	49	-	-	-	0
8/25/92	69 TO 80	0 TO 9	1100	-	133	790	0
9/17/92	NA	0 TO 14	2401	2401	-	2401	0
1/11/93	39 TO 42	0 TO 4	2200	4	-	1300	0
6/24/93	63 TO 64	0 TO 17	1100	145	-	330	0
6/30/94	NA	0 TO 31	-	2401	-	1587	0.28
9/26/94	63	2 TO 6	900	347	-	347	2 / 2.21
5/22/95	56	3 TO 35	2401	-	900	-	4 / 0.21
5/25/95	61	3 TO 24	1587	169	243	-	0.29
9/18/95	NA	19	1587	3500	-	-	2.51
9/20/95	63	1 TO 10	-	3500	2401	2401	3 / 2.51
10/18/95	48 TO 51	1 TO 26	243	37	2401	347	4 / 0.5
11/28/95	46 TO 50	1 TO 11	46	19	243	790	0
12/5/95	35 TO 43	1 TO 10	169	12	243	347	0
2/26/96	43 TO 46	0	8	4	8	61	2 / 0.51
2/29/96	NA	0 TO 5	37	14	17	532	5 / 0.51
3/4/96	NA	0	-	7	44	347	0
3/5/96	NA	0	-	2	132	1587	0
3/7/06	39 TO 43	0	-	46	35	347	2.41
3/20/96	37 TO 40	0	-	14	44	2401	0.42
4/9/96	46 TO 48	6	8	21	37	243	2 / 0.07
5/9/96	54	6	14	-	-	-	3 / 0.04
5/28/96	NA	7	44	-	-	-	0

Sampling Data 1991 to 1996 by DEQE and DMF
TABLE 1

Areas of Poor Water Quality

Three main pollution sources in the Back River were identified by DMF, the Fresh River @ South Street, Puritan Road and the site DMF calls "Wharf Street Creek" located near the landfill. Although Wharf Street Creek has consistently elevated fecal counts, there seems to be a gradual

improvement over the years in the other two pollution sources (Yashura 1996).

Fresh River

The Fresh River drains from the wetlands bordering Bouve and Brewer Ponds. It is possible, although unknown if the Hingham sanitary landfill leachate is the pollution source for the Fresh River. Leachate draining from the landfill could reduce the quality of water in the pond and subsequently the Fresh River and the estuary. Iron leaching was observed along French Street's west side from approximately Hobart Street north to Fresh River Avenue (Beal 1982?). The leachates continue to flow out of the landfill into the headwaters of the Fresh River where there is significant discoloration (Beal 1982). Other possible pollution sources include an illegal sewer connection or the septic hauler properties which abut the marsh and the Fresh River. Pollution of the Fresh River may impact the fish runs and breeding areas along the river although no studies have been done to verify the source or measure the impacts.

Puritan Road

Puritan Road is another identified pollution source, due primarily to cesspools and the effects of stormwater runoff. A single concrete storm drain from the Calhoun Street drainage area empties into the marsh at the end of Puritan Road. DMF monitoring confirms that this storm drain has persistently elevated levels of fecal coliform.

The Puritan Road drainage basin is also the site of a stormwater remediation program and is a designated Shellfish Bed Restoration Program (SBRP) site. The town of Weymouth applied for a grant from the Massachusetts Coastal Pollution Remediation Program to fund a nonpoint and stormwater control and abatement project for Puritan Road. DMF recommended Puritan Road as an SBRP site because it believes that mitigation of road runoff in this neighborhood will alleviate a major source of the contamination which keeps nearby shellfish beds closed (BH-9E classification by DMF. See Appendix I). According to DMF, mitigation of nonpoint source pollution from the Puritan Road drainage basin would allow conditionally restricted openings of the shellfish beds for that portion of the upper Back River south of Whale Island (Weymouth 1995).

The proposed stormwater remediation project consists of installing a system called StormTreat, which will reduce the amount of pollution entering the Back River from Puritan Road. StormTreat Systems was chosen because it was found to be affordable, easily installed and could be maintained fairly straightforwardly. A summary of water quality monitoring results from a StormTreat Systems site in Kingston, Masachusetts on the Jones River indicated that an average of 91% of the fecal coliform bacteria was removed from the stormwater runoff (Weymouth 1995). It is expected that with the installation of the StormTreat System, the levels of fecal coliform bacteria originating in the Puritan Road drainage basin will be sufficiently reduced to allow conditionally restricted shellfishing.

Wharf Street Creek

The town of Weymouth owns a former 17.5 acre landfill site located on Wharf Street, adjacent to the boundary of the ACEC. The bottom of the westerly slope of the landfill is partially

located within the ACEC, and some leachate from the landfill is affecting the salt marsh within the ACEC (BETA, 1995). Water quality testing by DMF indicates that this area is grossly polluted almost all the time. DMF suspects that undetected direct sewage hookups are the source of the high fecal counts, rather than the land fill (Yashura 1996). Historical literature points out that various factories and businesses had utilized the present outfall area as sewage disposal in the past.

Water Quality Testing Stations (Figure 3)

Weymouth

1- End of access road

This station sometimes tests poorly. It is located south of the shellfish growing area at the edge of a small point before the river narrows into the marshes.

2- Puritan Road

According to DMF, this station is usually a problem after a rain, due to septic systems, stormwater runoff and a high water table. Water quality should improve however, after the installation of the StormTreat System.

3- Opposite the U.S. Army Corps dock

4- Route 3A bridge

Hingham

1- Beal Cove south

2- Beal Creek

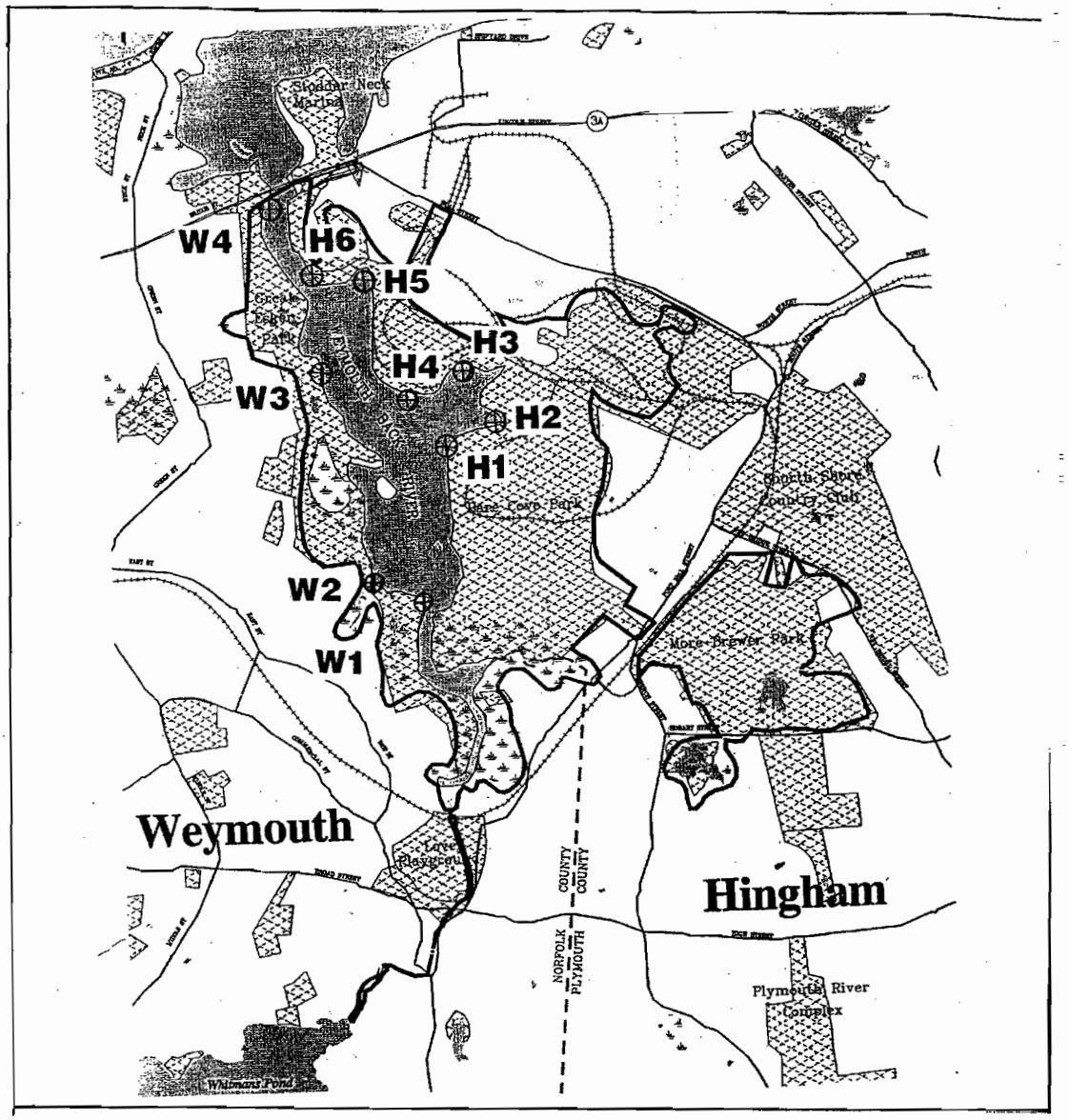
3- Beal Cove

4- Mussel Point

5- Bare Cove

6- The Narrows

According to DMF, the first water quality samples taken immediately after the shellfish beds were reopened in July 1996, had high fecal counts. DMF also reports that the water quality degrades going south. This is why the shellfish beds farthest south are not in the area designated for reclassification (Yashura, 1996).



WEYMOUTH BACK RIVER ACEC

Division of Marine Fisheries
Water Quality Testing Stations

Legend

- Protected Open Space
- Wetlands
- Weymouth Back River ACEC Boundary

FIGURE 2

Groundwater

U.S. Army Corps Naval Ammunition Depot Contamination Study

Under the U.S. Army Corps of Engineers (USACE) Defense Environmental Restoration Program, Ecology and Environment, Inc. (E & E) conducted a preliminary investigation of the former Naval Ammunition Depot on the Weymouth Back River. The Naval Ammunition Depot is located on the Hingham side of the river, approximately mid-way between the mouth and the head. Groundwater, subsurface soil and surface soil contamination was detected at concentrations that may require regulatory review (E & E 1992). Wastes such as shell casings, warheads, gas masks, and other unidentified military debris were found along areas of eroding river bank (E & E 1992). E & E also stated that since the site is currently used as a town park, there is a high potential for human contact with contaminated soil and possibly unexploded ordnance. In light of these observations, E & E recommended that this site be referred to the appropriate USACE agency to determine a future course of action, including possible remediation or possible removal from further consideration as a DERP hazardous/toxic waste site (E & E 1992). E & E also recommended that since the site is currently used by Hingham as a recreational area, that additional investigation take place to determine the source and extent of contamination at the site. E & E stated that their groundwater, surface soil and subsurface soil data were insufficient to determine the potential risks to human health and the environment from the site. The USACE currently has a proposed restoration project to remove the dock from the area but this apparently does not include a contamination evaluation (See Wetlands section for more detail).

No Discharge Area

The Back River Committee discussed the possibility of designating the Weymouth Back River a Federal No Discharge Area at the August 6 meeting. Designating the Weymouth Back River as a Federal No Discharge Area would further enhance and protect the water quality on the Back River. In order to apply for a designation, certain regulatory requirements must be fulfilled under the Clean Water Act and additional requirements met under MCZM. The Clean Vessel Act of 1992 and the CVA Pumpout Grants Program can be used to assist communities in the construction and maintenance of boat pumpout stations.

The discharge of untreated sewage by recreational and commercial boaters is prohibited under federal law in all areas within the navigable waters of the U.S. In areas other than Federal No Discharge Areas, treated wastes can be released from Type I and Type II Marine Sanitation Devices (MSDs) Even treated sewage can contaminate waters with bacteria, nitrogen and other chemicals. For this reason, Type I and Type II MSDs are not allowed to discharge in Federal No Discharge Areas. Only Type III MSDs may be used, which employ holding tanks for pumping out at shore-based facilities. Designating a No Discharge Area is an option available for communities to control boat sewage discharges and to protect the marine environment.

Floodplains

Due to their coastal New England location, Hingham and Weymouth are highly susceptible to storms known as "northeasters". A northeaster travels southwest to northeast along the Atlantic coast, collecting moisture over the ocean and sending it inland via northeast winds. Areas which have flooded in Hingham and Weymouth around the ACEC vicinity include the coastline between the Weymouth Back River and Hingham Harbor and the Stodder's Neck sewer pumping station which flooded by Hurricane Diane in 1955 (FEMA 1986).

Flood Protection Measures

Along the Weymouth Back River, a seawall is located on the south side of the neck below Upper Neck Cove. This seawall provides flood protection from high tides and also acts as a retaining wall to eliminate shoreline erosion. The tide gate at Broad Cove protects the area between Broad Cove Road and Thaxter Street from tidal inundation during the 100-year storm. Hingham maintains a flood plain district to prohibit future development within flood plain areas. This designation not only protects against flood damage to new structures, but also assures that the natural flood storage areas in the town will be protected. See Figure 3, Hingham Floodplain District, a map prepared from historic observations.

Stillwater Elevations

Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates by FEMA. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. See Figures 4 & 5), Back River Floodplain Zoning (FEMA 1986, 1989).

The 100 year floodplain along the Back River generally follows the 10 foot contour elevation. The stillwater elevation from Stodders Neck to Fort Hill Street is 12.2 feet on the Hingham side and 11.9 along the length of the Back River within the Weymouth community. These elevations reflect tidal and wind setup effects and include the contributions from wave action effects (FEMA 1986, 1989).

Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the Flood Hazard Factor (FHF = relationship between the depth and frequency of flooding in any reach). These zones are used primarily for insurance purposes by the Federal Emergency Management Agency and by the town of Weymouth as the basis for flood plain zoning. In Hingham, the flood plain zones are based on historic observations (Figure 3).

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods.
Zones A1-A7: Special Flood Hazard Areas inundated by the 100-year flood, with base flood elevations shown, and zones subdivided according to FHFs.
In the Weymouth Back River ACEC, Bear Swamp, Brewer Pond and Bouve Pond are classified Zone A. The rest of the river is classified as Zone A4 with the exception of Herring Brook. Herring Brook is Zone A3 starting approximately 300 feet upstream from CONRAIL to Commercial Street. From Commercial Street to Iron Hill Street it is classified as A2, and from Iron Hill Street to Whitman's Pond Dam, it is A8.

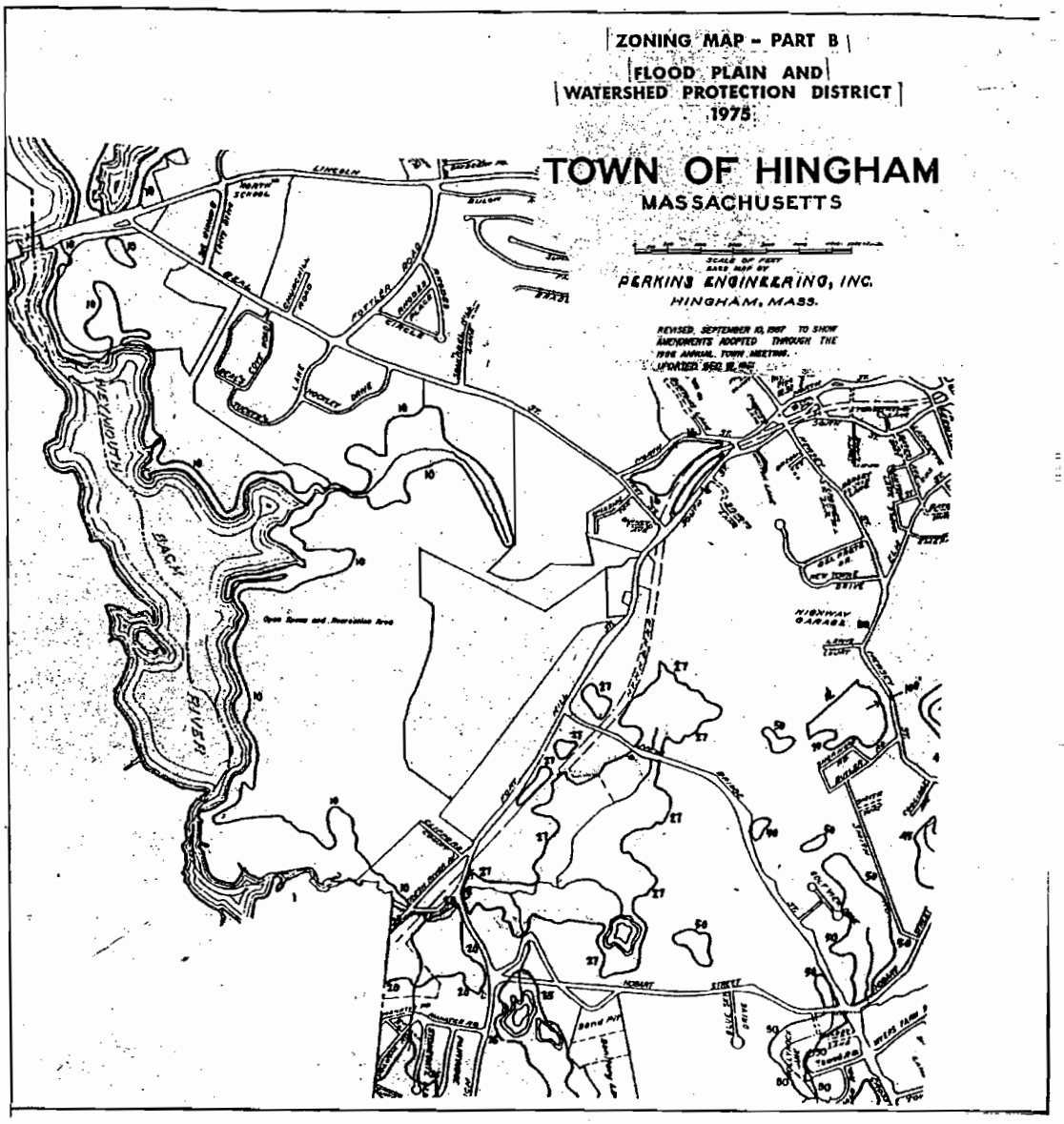
Streets along the Back River in Hingham and Weymouth which have encroached upon the 100-year floodplain include:

In Hingham
Bare Cove Park access road
CONRAIL

Along the Herring Brook
High
Commercial
Pleasant
Iron Hill

The National Flood Insurance Program uses the flood zones as a tool to assist local communities in floodplain management. The only concern are the streets mentioned above, portions of which have encroached into the 100-year floodplain, and which may possibly suffer damage in the event of a flood.

Generally speaking, the Weymouth Back River and the immediate vicinity has not suffered from flood damage in the past. Fortunately, the river is flanked on both sides by public open space (Bare Cove and Great Esker Parks) and has not seen development along its banks. Both the river and its wetlands will continue to act as beneficial flood storage capacity for Hingham and Weymouth in the future.



WEYMOUTH BACK RIVER ACEC

Hingham Historical Floodplain Boundary

Legend

FLOOD PLAIN AND WATERSHED PROTECTION DISTRICT

90 ALL ELEVATIONS REFER TO MEAN SEA LEVEL DATUM

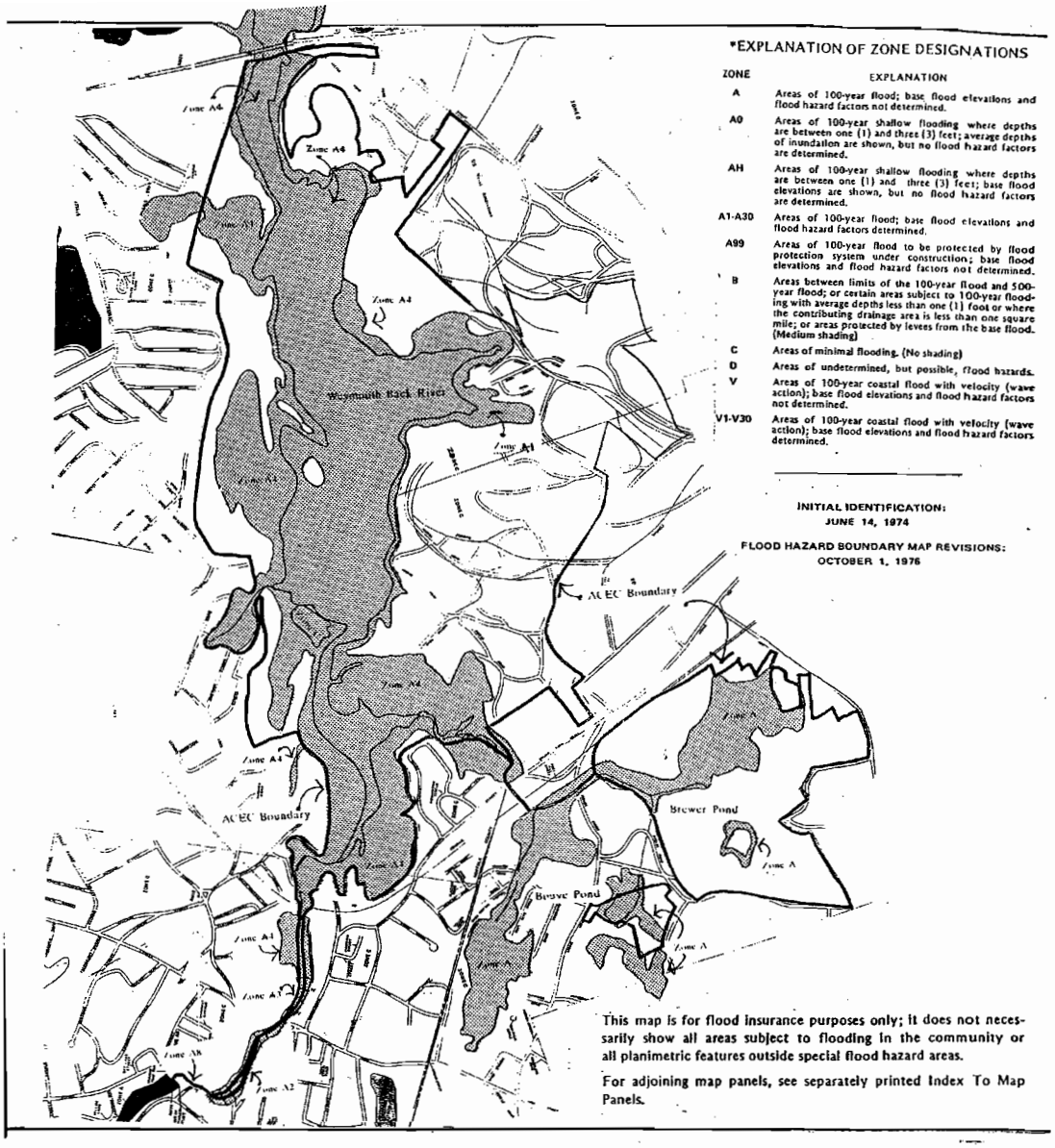
℄ CENTERLINE ℄ SIDELINE

℄ PROPERTY LINE DH DRILL HOLE

WHERE CONTOURS ARE USED AS THE BOUNDARIES OF THE DISTRICT, THEIR LOCATION ON THE GROUND SHALL BE DETERMINED BY THEIR ELEVATION BASED ON THIS DATUM, IRRESPECTIVE OF THEIR DELINEATED LOCATION ON THIS MAP.

ALL WATER AREAS IN HINGHAM HARBOR, RIVERS AND BACK RIVER AND ALL AREAS WITHIN A HORIZONTAL DISTANCE OF 75 FEET FROM MEAN HIGH WATER LINE, EXCEPT AS OTHERWISE SHOWN.

FIGURE 3



*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

INITIAL IDENTIFICATION:
JUNE 14, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
OCTOBER 1, 1976

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

WEYMOUTH BACK RIVER ACEC

Weymouth and Hingham Floodplain Boundary (FEMA)

FIGURE 4

Legend

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations* With Date of Identification e.g., 12/2/74
100-Year Flood Boundary
500-Year Flood Boundary
Base Flood Elevation Line With Elevation In Feet**
513

Estuarine and Freshwater Wetlands

In designating the Weymouth Back River as an Area of Critical Environmental Concern (ACEC), the Secretary found that the wetland resource areas included in the Weymouth Back River are significant to the prevention of pollution, flood control, the prevention of storm damage, the protection of fisheries, the protection of land containing shellfish, and the protection of wildlife habitat - all of which are public interests defined in the Wetlands Protection Act and its regulations. Water bodies included in the ACEC are the Weymouth Back River, Fresh River, Bouve Pond, Brewer Pond and Bear Swamp. There are more than 100 acres of salt marsh in the ACEC, and approximately 48 acres of freshwater wetland or 5% of the total ACEC acreage, located around Bouve and Brewer Ponds.

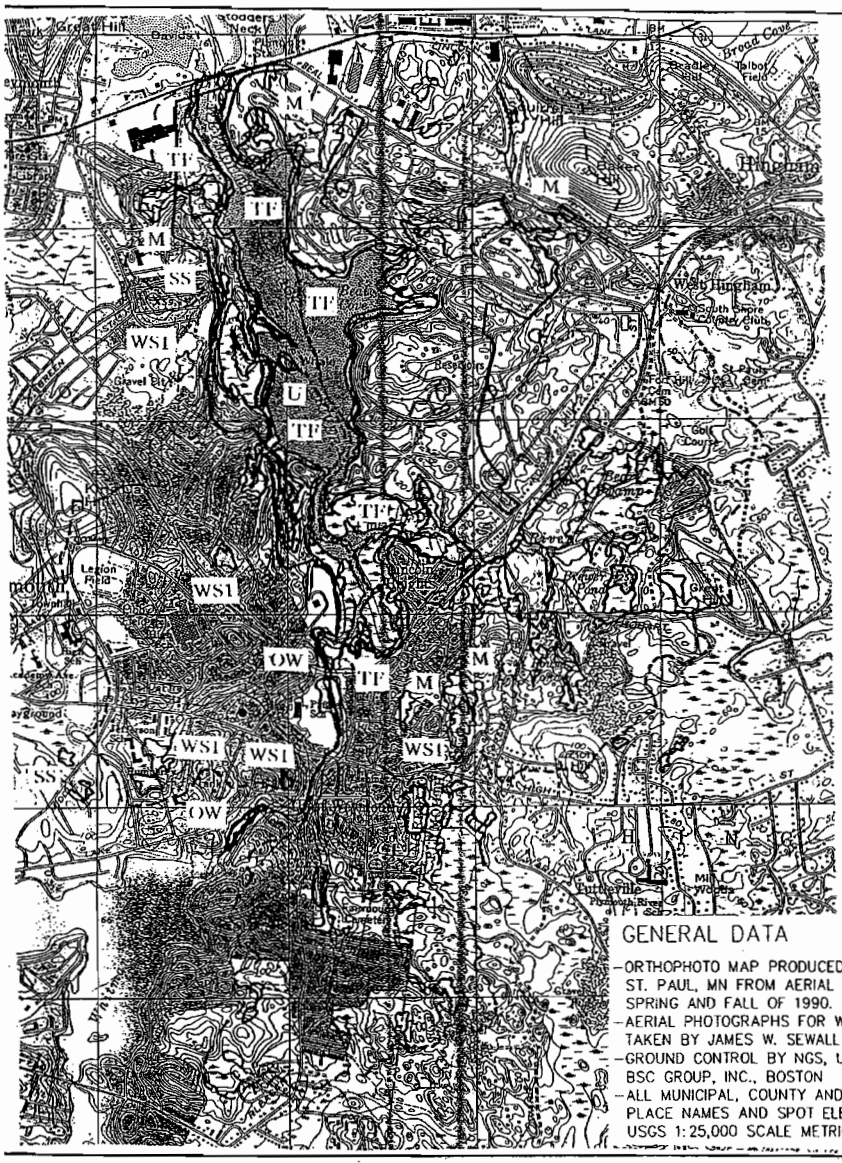
Shoreline types from the Environmental Sensitivity Index, a map produced jointly with Applied Geographics Inc. and the MassBays Program, along the Back River are predominantly salt marsh, but also include sheltered tidal and mud flats, vegetated low banks, and gravel beaches. See Figure xx under Shoreline Types.

Salt Marsh and Tidal Flats

Wetlands are also important to marine life in that they act as a filter by removing inorganic nitrogen compounds and metals from polluted land run-off. Most of the removal is probably achieved through absorption on clay-sized mud particles. Some of the nitrogen compounds trapped in the sediment are decomposed by denitrifying bacteria releasing the nitrogen to the atmosphere as nitrogen gas. Much of the remaining compounds are used for plant production in this environment, which is one of the most productive in the world. With the death of the plants, the organic nitrogen compounds are either incorporated into the sediment to be converted to peat or are broken up to become food for bacteria, fungi, or detritus-feeding shell and fin fish (Thurman 1978).

One of the predominant ecological and visual features of the Weymouth Back River ACEC are the extensive salt marshes. Salt marsh comprises approximately 13% of the total area of the ACEC. Salt marsh is valuable as a major source of carbon and nitrogen for the marine food chain, nursery habitat for juvenile marine species, habitat for diverse plant, bird and wildlife species, and serve as efficient filters for contaminants from upland discharges and urban runoff thereby helping to maintain water quality. In addition, salt marsh provides flood control and protection of uplands from storm damage, and is a valuable recreational resource.

The Back River ACEC has approximately 200 acres of tidal flats, comprising 26% of the ACEC. Tidal flats are found in estuaries, quiet bays, behind barrier beaches and in salt ponds. The substrate is composed of materials ranging from very fine silt and clay to coarse sands. It is the combination of salinity, substrate quality, and the character of water movement over the flat that determines the species composition of the plant and animal community. Large plants do not take hold on the flats because of the arduous nature of the sand-mud environment. Instead, most of the plants are microscopic algae and fungi that can tolerate surface exposure and do not need a physically stable surface on which to grow. Most of the animals of the flats have adapted to daily



GENERAL DATA

- ORTHOPHOTO MAP PRODUCED BY MARTINEZ CORPORATION ST. PAUL, MN FROM AERIAL PHOTOGRAPHS TAKEN IN THE SPRING AND FALL OF 1990.
- AERIAL PHOTOGRAPHS FOR WETLAND DELINEATION TAKEN BY JAMES W. SEWALL COMPANY IN SPRING 1990.
- GROUND CONTROL BY NGS, USGS AND GPS SURVEYED BY BSC GROUP, INC., BOSTON
- ALL MUNICIPAL, COUNTY AND STATE BOUNDARY DATA, PLACE NAMES AND SPOT ELEVATIONAL DATA TAKEN FROM USGS 1:25,000 SCALE METRIC TOPOGRAPHIC QUADRANGLES.

WEYMOUTH BACK RIVER ACEC

Wetlands Types

FIGURE 5

AREA COVERED BY ONE ACRE
(MIN. UNIT MAPPED = 1/4 ACRE)

Legend

DM	Deep Marsh	TF	Tidal Flat
M	Shallow Marsh	SM	Salt Marsh
	Meadow or Fen	BE	Coastal Beach
SS	Shrub Swamp	BB	Barrier Beach System
	Wooded Swamp	D	Coastal Dune
	Dominated by:	RS	Rocky Intertidal Shore
WS1	deciduous trees	OW	Open Water
WS2	coniferous trees	BA	Coastal Bank, bluff
WS3	mixed trees		or Sea Cliff
BG	Bog	---	Hydrologic Connection
CB	Cranberry Bog	U	Upland

environmental stress by burrowing beneath the exposed surface during low tide or by living there at all times. The algae of the flats are important food producers but they do not provide fully for the needs of the consumer animals.

The movement of tidal water as river currents carries the major supply of food, consisting of detritus and plankton, for these communities. This food source, the product of other coastal systems such as salt marshes and eelgrass beds, is capable of sustaining a high population of tidal flat animal life. The species of animal life in the Back River tidal flats varies according to the proportions of sand and mud making up the area. A familiar clam of the mud flat is the soft shell clam.

Location

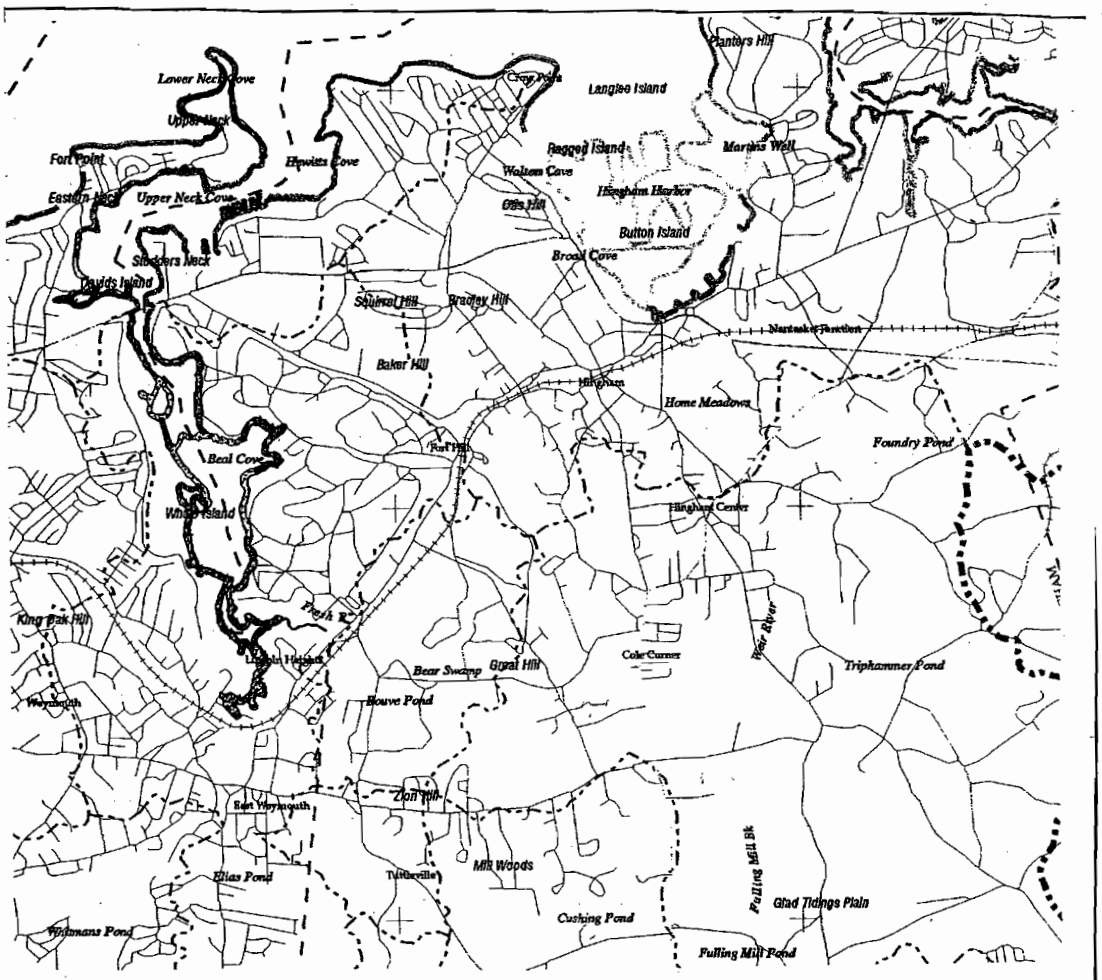
Within the ACEC, areas of salt marsh on the Hingham side are located in a small cove at the mouth of the river just south of the Route 3A bridge. This cove also has tidal flats. Moving south, there is a short stretch of coastal bank, followed by coastal beach. Going farther south, salt marsh is located on the northern tip of Bare Cove. Tidal flat is present in Bare Cove, Beal Cove and along the length of the river south of Whale Island. Salt marsh is present along almost the entire length of the Back River on both the Hingham and Weymouth sides. The most extensive areas are located at the head of the Back River where it narrows, and from this point north on the Weymouth side to Whale Island. There is also a small area of salt marsh on the Weymouth side farther north across the river from Beal Cove. There is another area of tidal flat just north of this salt marsh. A thin channel of open water runs down the center of the Back River from the Route 3A bridge to Herring Brook (DEP Wetlands Conservancy Program map 1992) (Figure 6).

Aquatic Vegetation

Approximately 18 plant and 12 algae species have been observed in the Hingham Bay area (DMF 1973). For representative plant and algae species, see Appendix II.

Vernal Pools

A DFW certified vernal pool is located just inside of the ACEC boundary in Bare Cove Park near the South Shore Music Conservatory. Five more vernal pools are located in this area but are just outside the ACEC boundary. Another vernal pool in the ACEC is located along the Route 3A bridge on the Hingham side. Vernal pools are temporary bodies of freshwater that provide critical habitat for many vertebrate and invertebrate wildlife species. "Vernal" means spring, and most vernal pools are filled by spring rains and snowmelt, only to dry up during the hot, dry months of summer. Many vernal pools, though, are filled by the rains of autumn and may persist throughout the winter. Vernal pools are often very small and shallow; vernal pools which support rich communities of amphibians, and invertebrates may measure only a few yards across. However, vernal pools of several acres are common throughout much of Massachusetts (Natural Heritage & Endangered Species Program 1996) (Appendix III).



1990 SHORELINE TYPES FROM ENVIRONMENTAL SENSITIVITY INDEX (ESI)

Map produced by Applied Geographics, Inc., and the Massachusetts Bays Program.

These maps are for planning and educational purposes only and should not be used for survey, engineering, legal, or regulatory purposes, or for parcel-level analysis.

MILES
0 0.25 0.5 1

This map is a generalized depiction of the ESI classification that ranks shoreline types by their sensitivity to spilled oil. The data contain known errors and have not been field checked, verified, or updated by local agencies. They should NOT be used for oil spill response. The map is intended only to depict the current status of the data. NOAA did not participate in conversion or QA/QC of this data. See the User Guide for data sources and description. Data provided by MassGIS and Massachusetts Coastal Zone Management.

WEYMOUTH BACK RIVER ACEC

Shoreline Types (ESI)

FIGURE 6

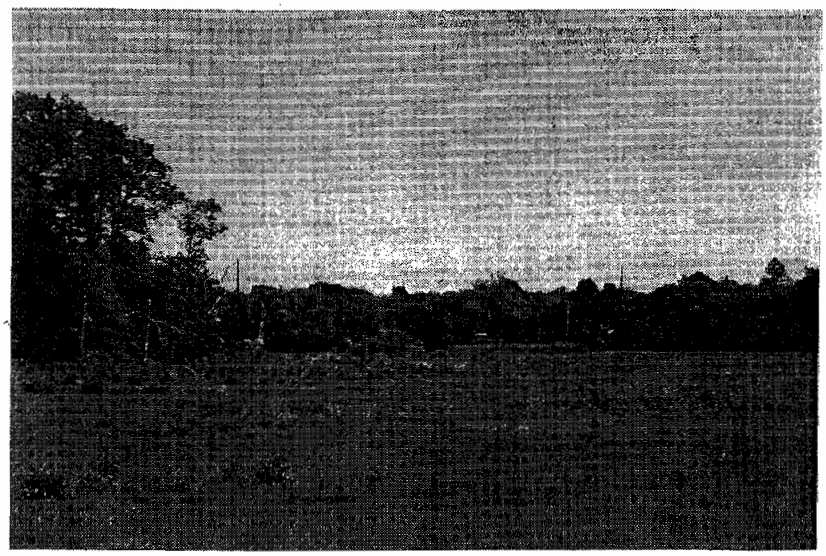
Legend

- Exposed rocky cliffs & seawalls
- Exposed wave-cut bedrock platforms & scarps
- Fine- to medium-grained sand beaches & eroding scarps
- Coarse-grained sand beaches
- Mixed sand & gravel beaches
- Gravel & shell beaches, or rip rap
- Exposed tidal flats
- Sheltered rocky shores, rubble slopes, or man-made structures
- Sheltered tidal flats, sand or mud flats, vegetated low banks
- Marshes
- Unranked man-made structures

The Massachusetts Wetlands Protection Act, Title V of the Massachusetts Environmental Code, the Massachusetts Surface Water Quality Standards, and the Forest Cutting Practices Act all provide certain regulatory protection for vernal pool habitat. Such protection is not automatic, however. The Wetlands Protection Act regulations protect vernal pools located only within Wetland Resource Areas. The regulations presume that vernal pools do not exist on a site unless they have been officially certified by the Natural Heritage & Endangered Species Program of the Division of Fisheries & Wildlife, or if scientific evidence is presented to the local conservation commission or DEP which clearly demonstrates that a Wetlands Resource Area functions as wildlife habitat. The regulations for Title V, the MA Surface Water Quality Standards, and the Forest Cutting Practices Act protect vernal pools, regardless of their size or location, if certified by the Division. Only vernal pools that meet certain biological and physical criteria established by the Natural Heritage & Endangered Species Program can be certified (Natural Heritage & Endangered Species Program 1996).

Condition of the Wetland Resources

The extensive marshes of the Back River ACEC are a healthy, stable and diverse habitat of salt marsh plant species. However, they are beginning to show signs of degradation especially in the marshes adjacent to the Fresh River. A stand of Phragmites Australis has become established where the Fresh River empties into the Back River. The cause of its invasion and whether or not its is spreading is unkown.



Sedimentation and erosion is a threat to the integrity of the salt marshes. Several new residential developments have been built adjacent to the Back River and two more may come on line soon.

A new development, Conservatory Park, involves a controlled discharge of roadway runoff from two "upland detention basins" into a stream tributary to Tucker's Swamp, an area included in the ACEC. The U.S. Army Corps of Engineers Defense Environmental Restoration Program involves ecologically restoring a slope and planting salt marsh vegetation. Activities carried out under this project which could result in erosion and sedimentation will have to be minimized.

The freshwater wetlands of Bouve Pond and the brackish marshes of the Fresh River show signs of degradation. Human induced impacts are resulting in "cultural" eutrophication. New plant species are invading and these "exotic" species (as opposed to indigenous species) may take hold rapidly and either colonize unused habitat or outcompete existing plants or animals. At Bouve Pond, one of the embayments exhibits oil and iron stains, another embayment is degraded. The cause of the changes occuring in these wetlands is unknown.

Habitat Resources

Wildlife

Bare Cove and Great Esker Parks provide breeding or feeding habitat for some 150 species of birds as well as mammals, reptiles and amphibians (Appendix IV). Recently sighted species include the red fox in Great Esker Park and the osprey in the Back River. The Great Esker Park staff put up a nesting pole for the ospreys in 1993 when a pair on Whale Island abandoned their nest after failing to lay eggs 3 years in a row. Before this there had been no osprey sightings in over 20 years. The Boy Scouts in Hingham also put up 3 additional nests. The ospreys have returned and in 1995 a total of 10 birds were sighted on the Back River.

Rare and Endangered Species

Species state-listed by the Natural Heritage & Endangered Species Program (NHESP)include the Osprey (Special Concern), Short-eared Owl (Endangered), Northern Harrier (Threatened), Sharp-shinned Hawk (Special Concern), Loggerhead Shrike (Endangered), American Bittern (Special Concern), Common Loon (Special Concern), Eastern Box Turtle (Special Concern), and the Wood Turtle (Special Concern). The NHESP recommends the establishment of a minimum 50-foot no-cut buffer zone along the streams and rivers and the implementation of erosion controls that may be appropriate for a specific site where the turtle species may be found, for its preservation (New England Wildlife Center 1988) (Appendix V).

Finfish

Fish runs and spawning grounds in the ACEC include the Herring Run Brook and Fresh River. Herring Brook has an annual herring run and the Fresh River has both an eel and smelt run, although they are not as visible as the Herring Brook run. Altogether there are five smelt breeding areas in the ACEC, two in Hingham and three in Weymouth (Henderson 1989).

Anadromous fish species such as alewives, smelt and shad play an important role in the sport and commercial fisheries of MA. During colonial times, these fishes occurred in great abundance in most of MA's coastal rivers and streams and seasonally provided early settlers with a readily available food supply. With increases in population and industrial growth, the fish stocks rapidly diminished. Pollution also affected the runs. Careless discharge of waste effluent from mills and factories killed spawning adults and destroyed spawning and nursery areas in the rivers (DMF in Beal 1982).

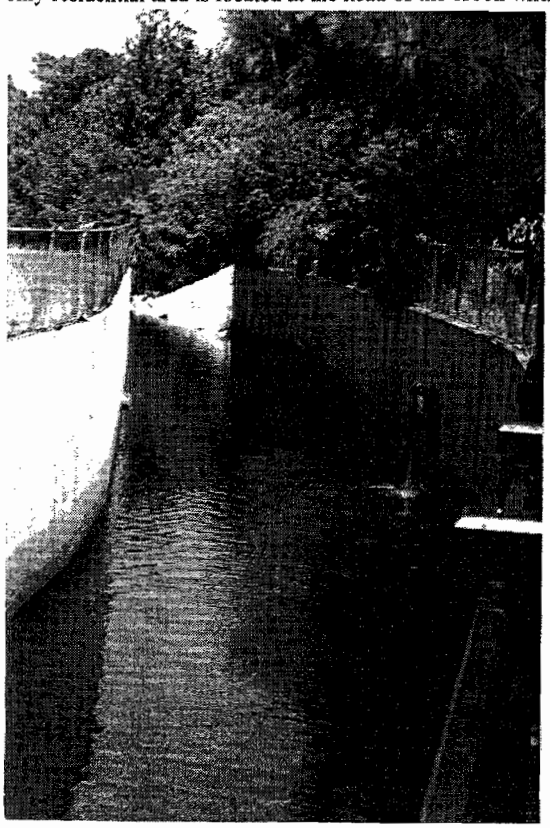
The wetlands in the Back River area provide habitat for 31 species of fish, many of which are commercially and recreationally caught offshore. Some of the most common species include: Alewife (herring), American Eel, Atlantic Silverside, Three Spine and Four Spine Stickleback, Mummichog, Rainbow Smelt, Northern Pipefish, Stripped Killifish, and Winter Flounder (DMF 1973).

Alewives

Herring Run Brook is an anadromous fish run that flows out from the northeast corner of Whitman's Pond and runs approximately one half mile before entering the southern tip of the salt

marsh located at the head or south end of the Back River. Alewives, members of the herring family (Alosa pseudoharengus), are aided in their journey from the Weymouth Back River to Whitman's Pond by the presence of six fish ladders. The alewives make this trip to spawn in the fresh water of Whitman's Pond. From April 1st through June 30th, the adult fish come to spawn and return to salt water. The small 2-4 inch alewives make their first trek to the sea in the fall, between September 1st and October 30th (Beal, R.F. 1982).

Herring Run Brook runs through an area known as Jackson Square in Weymouth. The land adjacent to the brook is zoned as general business, general industrial, and public/semi-public and open space. The only residential area is located at the head of the brook where Whitman's Pond



flows into it. The brook runs above and underground through the general business zone. In 1982, Herring Run Brook was cleaned up and repaired with funds from a community block grant due to the efforts of the Weymouth Herring Run Committee.

In 1982, the state took over possession of all the herring runs in the state until management plans were written. The Herring Run Committee in Weymouth was formed at that time. Presently there is one warden and two assistant wardens, all volunteers. A Herring Run Management Plan was drafted in 1979/80 but has never been finalized.(Appendix VI)

Smelt

The Fresh River enters the estuary at its southeast end. It is comprised of drainage from Bear Swamp, Brewer Pond, Bouve Pond and a small unnamed stream west of French Street and their associated wetlands. It serves as a spawning area for smelt. Much of Bear Swamp and all of Brewer Pond are under the stewardship of the Hingham Conservation Commission, comprising more than 160 acres locally known as the Grossman property and More-Brewer Park. The latter was recently donated to the town (approximately 150 acres). Bouve Pond is also under the control of the Conservation Commission. Bouve Pond is bounded to the east by the town of Hingham's sanitary landfill. Iron leaching was observed along French Street's west side from approximately Hobart Street north to Fresh River Avenue marking the site of the landfill (Beal 1982). Siltation was observed entering Bouve Pond. A silt filled delta is being created by erosion due to drainage and an unstabilized slope. No studies have been done to determine the effects of silt or leachate on the smelt.

Shellfish

Economic Importance

The Weymouth Back River has approximately 150 acres of clam flats of which the most productive were determined to be those located in Beal Cove (DMF 1973). In 1970, these flats produced 17,380 bushels of legal-sized clams. Yield estimates for Weymouth area and the Back River in 1970 determined that an estimated 662 bushels of legal-sized soft shell clams valued at $7,944 could not be harvested because of gross pollution (DMF 1973). Production levels for BH-9D (Appendix I) in 1987 and 1988 were 980 and 1489 bushels respectively. At a 1989 economic value of $70.00 per full bushel, this indicates that the 1987 and 1989 crops were worth $17,773. Approximately $20,000-$28,000 has been collected annually from permits, licenses and rack fees (Buotte 1996). Historically, the income generated both from the sale of clams on the market and from municipal fees indicates that harvestable shellfish beds are a significant source of income for the local communities and the diggers. It is to both towns advantage to work together to maintain the Back River as a harvestable shellfishing area. There may also be the possibility of returning mussels, lobster and oysters to the Back River as they existed in previous years.

Location

The shellfish beds in the Back River are named BH-9D and BH-9E by the Division of Marine Fisheries. The BH-9D beds are located on both the Weymouth and Hingham sides of the Back River, south of Route 3A and north of a line drawn from the white pipe at the foot of Puritan Road due east to the white pipe on the opposite shore located in the town of Hingham. The BH-9E beds are located south of the white pipe at Puritan Road but are closed to shellfishing (Appendix I). The clam species is the soft shell clam (Mya arenaria).

Contamination

Surveys conducted by DMF determine whether shellfish populations may be safely utilized for human consumption. The presence of outfalls discharging untreated sewage in areas adjacent to shellish beds usually results in totally restrictive harvest regulations. Degree of contamination is determined by fecal coliform bacteria counts which are indicative of the presence of pathogens. Overlying waters of shellfish areas are classified by standards developed by the U.S. Public Health Service and member States of the Cooperative Program for Certification of Interstate Shellfish Shippers. The accepted standards are: clean, moderately contaminated, grossly contaminated (DMF 1973). Shellfish from areas designated clean may be harvested and used for human consumption without treatment. Shellfish from moderately contaminated areas may be harvested only by licensed master diggers and their employees and must be conditioned prior to marketing at the Shellfish Purification Plant at Plum Island, Newburyport. Areas designated grossly contaminated are closed to the taking of shellfish for human consumption (DMF 1973).

The primary source of contamination in the Back River in the past was periodic sewage overflows from the MDC Stodder's Neck Pumping Station, which permitted raw sewage to enter the Back River directly. This overflow and other pollution sources, caused the state to close down the shellfish beds in 1988 (Henderson 1989). The pumping station has been repaired, and according to DMF, only three significant pollution sources remain (Yashura 1996). One pollution source is the Fresh River. The Fresh River drains out of Bouve and Brewer Ponds and the wetland areas surrounding the ponds. The pollution source in this river is unknown.

Another known pollution source is a small creek which enters the Back River at Puritan Road. This pollution is due to known problems with stormwater runoff at residences in the Puritan Road drainage basin. The Puritan Road drainage basin is a designated Shellfish Bed Restoration Program site (SBRP) DMF recommended Puritan Road as an SBRP site because it believes that mitigation of road runoff in this neighborhood will alleviate a major source of the contamination which keeps the nearby shellfish beds closed. (See Water Quality section for more detail).

The Back River shellfish beds were reopened for harvesting on July 15, 1996 by DMF. This success was due to the efforts of the Back River Committee to both identify and remediate the sources of contamination in the Back River, a clean-up initiative was undertaken starting with the repair of the Stodder's Neck Pumping Station in 1992. The DMF conducted a Sanitary Survey required by the federal government in order to reopen closed shellfish beds. This report is currently in the final draft stages. The study includes monthly water quality testing at different stations on the Back River, as well as shellfish testing and a comprehensive site assessment. Digging in the Back River shellfish beds had been prohibited entirely for 8 years. Before July 1996, the area had not been dug since July, 1988. In 1988 and 1987 it was dug 11 days and 12 days respectively (Henderson 1989). The water quality of the Back River has improved significantly from its previous state, and the shellfish beds were reopened as a result. (See Water Quality)

The shellfish quality is highest near the mouth of the Back River where the flushing rate between the river and the ocean is best. South of the Route 3A bridge, the quality of resources is

reportedly lower, but still good, according to officials of DMF (Henderson 1989). As of July 1996, the shellfish beds of the Back River are classified as "mildly contaminated". The Back River ACEC previously tested as either "mildly contaminated" or "grossly contaminated", depending on stormwater runoff. The local diggers see the process of community growth as being directly connected to the harvesting of healthy, market size soft shell clams (Beal 1982).

The shellfish beds in the Back River are dug by Master Diggers from Hingham, Weymouth and Hull. Transportation into the river is allowed by boat only (Appendix VII). The shellfish beds were dug for the first time in 8 years when they were reopened on July 15, 1996. However, the diggers reportedly were not satisfied with the quantity/quality of the clams, and have only dug the area twice since it was reopened (Buotte 1996). The clams were watery and small, from not having been dug for many years. Also, the numbers were reduced, possibly from overpopulation which may have caused competition for food resources or an increase in disease. The Hingham Shellfish Warden suggested that the Hingham Shellfish Management Plan include a provision for the rotation of digging areas by the Master Diggers. This would allow more time for the seed clams to regenerate after an area has been dug.

In response to the reduced quantities of clams in the Back River, the Master Diggers of the area had proposed that the town of Hingham pay them $25 a flat to propagate the Back River clam beds with clams from the Back River area just north of the Route 3A bridge. A proposal may be put before the Hingham Board of Selectmen to set aside funds for shellfish propagation (Buotte 1996).

Geologic Features

The Weymouth Back River ACEC contains a glacial geology that may be unique to coastal New England. An interrelated series of glacial eskers, salt marsh coves, salt ponds, salt brooks and Whale Island represent one of New England's grandly scenic urban-centered marine ecologies. These geologic formations, in conjunction with several undisturbed prehistoric culture sites, are outstanding natural resources that should be preserved and protected for future generations (Back River Study Committee 1979).

The last continental glacier, the Late Wisconsin, advanced roughly 25,000 years ago, fully covering this portion of Massachusetts with at least 1000 feet of ice. After resting here approximately 13,000 years, it then retreated. Numerous drumlins (accumulations of clay and glacial till deposited and sculpted into typical stream-lined shapes) remain as the major lasting contribution of the glacial advance. The glacier also left significant elevated features in its melting and retreat stage. These ridges and hills are composed of both sorted and unsorted gravel/sand mixtures. Eskers, crevasse filling, and delta-like kames are some of these melting glacier formation, composed of stratified sand and gravel layers. Huge streams of meltwater flowed underneath the till-laden ice. Sorting and polishing as they flowed, long meandering ridges called eskers were deposited in their wake when the ice melted. Triangular in cross-section, they represent the sediments that filled in the meltwater stream beds underneath the glacier. Dramatic in profile, they stand out like railroad embankments across the countryside. The delta-like deposits of fine sand left at the mouth of these meltwater streams are called kames. They provide ideal construction materials and excavation sites. The sanitary landfill site in Hingham off Hobart Street is located on one of Hingham's more prominent kames (Hingham Open Space Plan 1996).

The 'great esker' in Great Esker Park forms the eastern boundary and stands some 90 feet high and extends for over two miles (Beal 1982). It may be the largest example of such a geologic formation in the eastern United States. Great Esker Park marks the site of one of the largest, if not the largest esker on the east coast. An esker is a long narrow sinuous ridge of stratified glacial drift deposited in a former tunnel or stream bed beneath a glacier. The esker in Great Esker Park is largely undisturbed, only a small portion has been excavated on the esker's west side where housing lots were drawn up to include the esker. The esker was dug into to build houses and presently, residential housing abuts part of the esker. On the Hingham side small eskers were observed in the past. Due to the development of this side of the river by the U.S. government for the purpose of a naval ammunition depot, only traces of what once were eskers are gone. The geomorphology of the eastern area indicates the presence of a kame.

Human Uses

Cultural, Historical and Archeological Resources

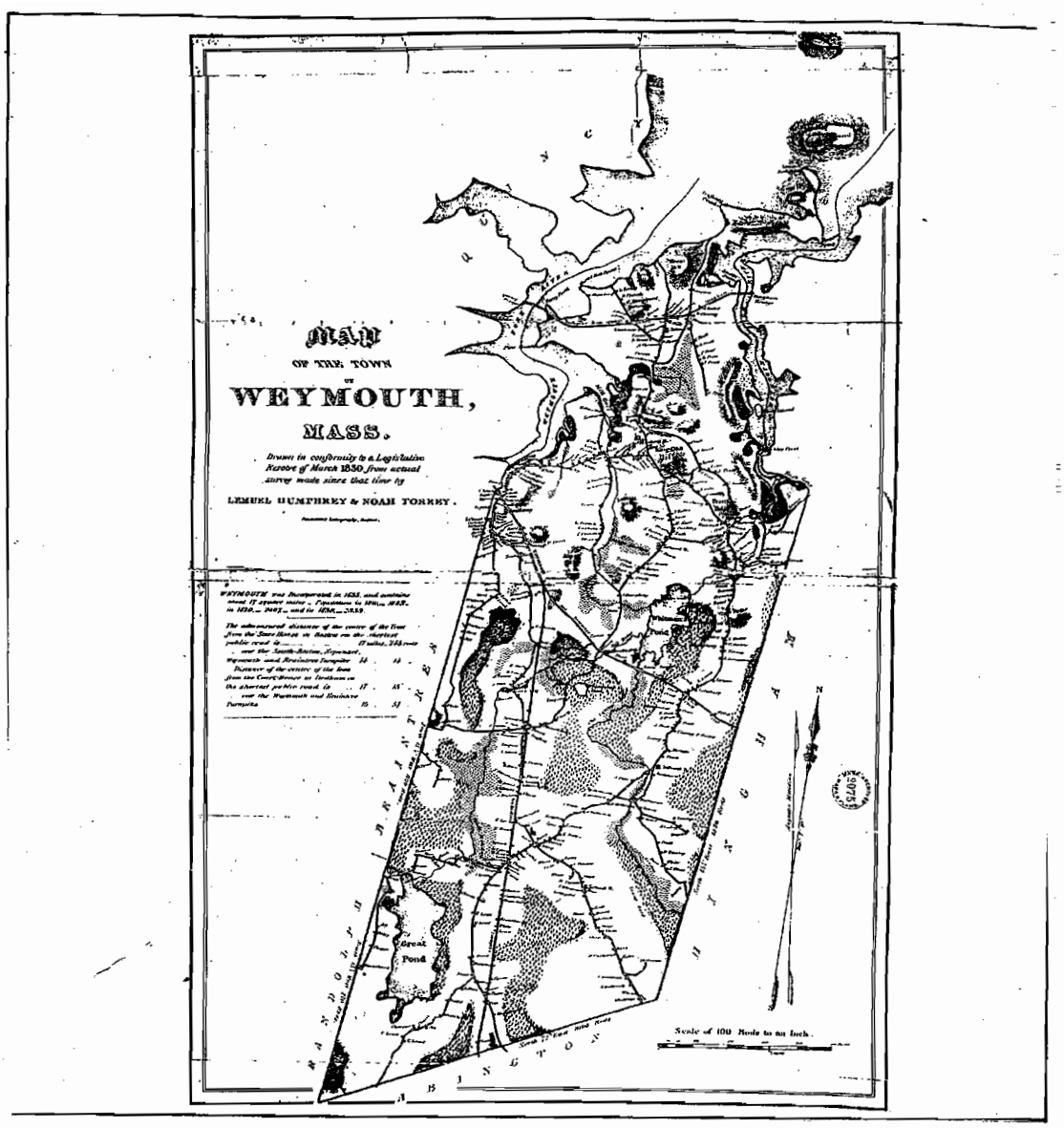
Three distinct groups of Native American cultures have been documented to have resided in the Back River area. The Stone Bowl Makers, Flint Workers and Woodland Indians all lived on the surrounding eskers and plains. Much evidence suggests that the natives moved to the river in the summer and returned to the higher more protected uplands in the winter. A long-term study and assessment is currently being undertaken by local and state archaeologists to determine the extent of use by pre-historic peoples. Present evidence suggests that as many as eight pre-historic cultures utilized the river surroundings (Beal 1982).

Europeans settled the area in the early 1600s under the Reverand Peter Hobart, naming the area Bare Cove. It later became known as Hingham (town of their English heritage). Resource use included the fish and shellfish and salt marsh hay. Later, the area was used mainly for grazing and agriculture. Woolen mills existed in the Wharf Street area in Weymouth and shallow draft barges were used for river transport to and from mills (Beal 1982).

Tucker's Swamp was the site of a peat works in the late 1700s. As many as 35 buildings once occupied the site. The two ponds that now exist are a direct result of the peat removal. Today, the ponds provide the nesting and roosting site for 30 to 50 great blue heron and numerous other birds and wildlife. Sporting camps also abounded the area. Situated along both sides of the river, including Whale Island, they provided fowl hunting for the men (Beal, R.F. 1982).

The U.S. government through the U.S. Navy, built an ammunition depot on the Hingham side of the Back River, in the early 1900s. The facility provided for the manufacture, storage and transport of Naval ammunition. The building, presently used as the observation tower, housed a type of gas manufacturing plant. The U.S. Navy acquired the Weymouth shore of the river during World War Two. The Great Esker provided the necessary buffer required for the expanded use of the depot. An area at the Naval Ammunition Depot was dredged to allow for turning and loading of the ammunition barges. It is now the deepest section of the upper estuary.

In 1972, the property now known as Bare Cove Park was transferred to the town of Hingham under President Nixon's Legacy of Parks program. Under the terms of the deed, the Selectman are custodians of the land. The Selectman appointed what is now the Bare Cove Park Committee to oversee the removal of structures and to develop park management procedures. Many of the structures were in such disrepair when the town regained ownership that they were razed. The depot sat vacant some twenty years before it was released to local use. Much of the depot was allocated for open space, thus establishing Bare Cove Park. The area also had land designated for the Hingham School Department use, the Massachusetts National Guard, the South Shore Music Conservatory, the Fire Museum and private development (Beal 1982). Both the Selectmen and the park committee agreed on a policy of passive-use development that would provide a limited recreational use that would compliment the outstanding scenic amenities as well as protecting the valuable fishery and wildlife resources (Hingham Open Space Plan 1987).



WEYMOUTH BACK RIVER ACEC

Map of Weymouth and Back River
Circa 1830

FIGURE 7

Special Use/Recreation

The Back River's unique location within a densely populated urban area, less than 20 miles from the center of Boston, combined with its size and beauty, establishes it as a major urban-centered recreational, educational and natural resource, and gives it a regional importance far beyond the borders of Hingham and Weymouth. The river's natural topography south of the bridge, its beauty and its ability to protect against intrusion from development, underscores its value as a major large-scale scenic open space. The pristine and quiet beauty of the river's southerly portion is rarely found available within such a short driving distance of a large urban center (Back River Study Committee 1979). Within a 15 mile radius of the Weymouth Back River, there are an estimated 2.5 million residents. Bare Cove Park and Great Esker Park are composed of an adjoining unspoiled estuarine environment. The aquatic and land-based passive recreation of this area serves as a refuge from the pressures of daily life.

The New England Wildlife Center is located on Fort Hill Street and is also accessible from Bare Cove Park. The center is a non-profit, full-service wildlife hospital. The ultimate goal of the Center is to take care of the sick, injured and orphaned wild animals so that they may be released back to the wild. The Center employs undergraduate and graduate-level interns and conducts research on medical and surgical data which is used to train the staff, volunteers and interns. The Center also cares for 20 unreleaseable educational animals and puts out a newsletter. A wildlife inventory was conducted by Richard Horton and Victoria Smythe in 1989, based on sightings from 1985-1989 (Appendix IV).

Recreation

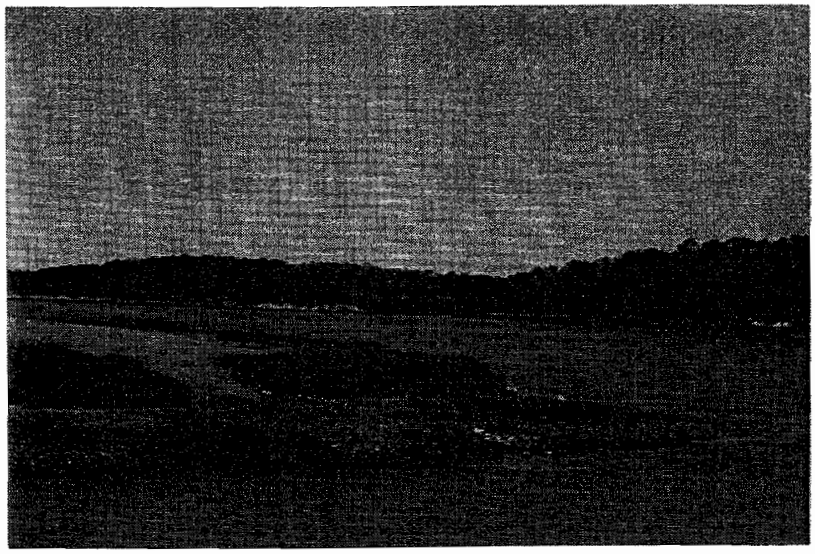
Bare Cove Park and Great Esker Park

Recreation activities during the winter months include cross-country skiing, snow-shoeing and ice skating. Spring and summer recreation include walking, jogging, hiking, biking, canoeing and picnicking. Flora and fauna observation becomes a favorite pastime for such groups as the New England Wildflower Society and the Massachusetts Audubon Society, which has listed in its Breeding Bird Atlas 59 species of birds in the area (Back River Study Committee 1979).

For most of Hingham's history the region adjacent to the Weymouth Back River, south of the 3A bridge was utilized for agriculture and known as Hockley. The region was always regarded for its natural beauty. A Hingham resident of the 1880's wrote that , "Hockley is an extensive district, consisting of hundreds of acres of rolling country embracing fine meadows, woodlands and a beautiful waterfront on Weymouth Back River. It is one of the most attractive localities in Hingham" (Hingham Open Space Plan 1987).

In 1984 the towns of Hingham and Weymouth designated both Bare Cove and Great Esker parks as wildlife refuges officially recognized by the state. In 1986, the state officially recognized the 705 acre open space as, "a special place designated by the Massachusetts Executive Office of Environmental Affairs because it exemplifies the unique qualities of the Commonwealth". Also in 1986, the Weymouth Back River estuary, south of the Route 3A bridge, was designated as a Massachusetts state Scenic River.

There are also numerous walking and hiking trails through the esker in Great Esker Park and around the marshes. Distinctive visual features include two "reversing falls", Sugar Plumb and Twin Oak, a kettle hole and scenic views of the marshes, the river and the esker. Great Esker Park has its headquarters and a Nature Center at the main entrance off of Green Street. Nature classes are held for children during an 8-week summer program which includes picnics, fishing, family walks, canoeing and other types of nature exploration and outdoor recreation. Great Esker Day is celebrated each year with music, live animals from the Trailside Museum in nearby Milton, van tours and canoeing. The Great Esker canoeing program also tours the North River, Cohassett, Hingham Harbor and Concord.



Herring Brook

In spring, Herring Brook is abundant with alewives making their way up the fish ladder network to Whitman's Pond, their spawning and nursing area. The herring run passes through Jackson Square in Weymouth and provides an excellent opportunity for public viewing of fish spawning grounds. During the summer, boating becomes more popular, as well as water-skiing and recreational fishing.

More-Brewer Park

More-Brewer Park in association with the adjacent Wilmon Brewer property contains significant glacial land forms represented by the Great Hill drumlin kettle holes, and two parallel kame ridges with narrow summits and steep sloping sides. These in conjunction with Pigeon Plain and its associated kettleholes on the adjacent Brewer Reservation form a cohesive geological unit of significance.

significance.

More-Brewer Park is also historically significant as it is a late nineteenth century American country estate. Inspired by his father's distinguished World's End Farm, and its landscape architect, Frederick Law Olmsted, Francis W. Brewer proceeded to purchase land and lay out his Great Hill estate circa 1884. In 1980, Dr. Wilmont Brewer and his wife Katherine More Brewer, donated 107 acres of the Great Hill estate to the town of Hingham. The Wilmon Brewers ensured that the park will be maintained with an endowment gift of $60,000 (Hingham Open Space Plan 1987).

Walking, jogging or hiking is possible on several well traveled carriage roads within More-Brewer Park and Brewer Reservation, where Bouve Pond is located. In More-Brewer Park there is a unique meadow and a swamp trail along Brewer Pond and Bear Swamp. Additional activities include geological interpretation, group nature interpretation, winter ice-skating and cross-country skiing, picnicking and wildlife observation. The network of winding carriage roads, Bear Swamp Trail, geological formations, scenic meadows, foundations, landscape planting, ponds and a wide variety of wildlife cause this estate park to be one of the South Shore's most sensitive and rewarding open spaces for group, family or individual excursions. More-Brewer Park, more than any other large tract of property under the management of the Hingham Conservation Commission, contains outstanding aesthetic, geological and wildlife attributes necessary for producing a unique interpretive brochure.

Scenic Vistas

From both ends of Bare Cove and Great Esker parks a vast panorama of water stretches away into a distant haze. The shoreline on both sides is dominated by a series of forested glacial eskers, kettleholes, and drumlin hills that are contrasted against the flat plain of the Back River estuary. The central feature of Bare Cove Park is Beal's Cove, a superbly scenic double-bayed indentation in the river shoreline that can be viewed from the park's observation tower. From the tower, one looks down upon acres of saltmarsh cut by the deep channel of Hockley Brook which empties into the cove's north bay. Many species of wildlife have been observed from the tower including seals, eagles, osprey, herons, sea turtle, egrets, hawks, owls, fox, raccoons, skunk, muskrat, quail, woodcock, pheasant and many other species of waterfowl and upland birds.

Associated with Hockley Brook is Tucker's Swamp, a wild, tangled maple swamp that boasts century old trees and huge specimens of poison sumac. Along the three miles of paved roads there are level fields and open patches where cedars, larch, woodbine, sumac, wild roses, blueberry, goldenrod and asters provide startling patches of fall color set against blue glimpses of the river (Back River Study Committee 1979).

Indian Point juts out into the river at the park's southern end. From the steeply sloped summit there is a panoramic view north along the river that is unequaled anywhere within the entire reach of the Boston Harbor basin. The undulating shoreline of both parks is beautiful at any season. A shoreline walk provides new vistas at every turn and a wealth of material for the nature photographer.

Resource Management

Management Entities

Agencies which have roles in the regulation and management of the Weymouth Back River include a variety of both state and local organizations. As the Back River is divided by the town boundaries of Hingham and Weymouth, the local regulatory agencies of both towns share responsibility for the management of the river.

Municipal

Back River Committee
The Back River Committee was established by Town Meeting in 1979, with members selected by the Selectman of Hingham and Weymouth according to a prescribed method. The charge of the committee was "to look after the interests of the river, especially its valuable resources" (Weymouth Back River Study 1979). The official Back River Committee has worked continuously since 1979 carrying out its duties for 17 years. Dr. Mary Sears of the Woods Hole Oceanographic Institute has acted as the official scientific advisor.

The purpose of the Back River Committee was defined as follows: "To study and make recommendations for the optimum use and development of the Weymouth Back River with particular regard to recreation and boating opportunities. To confer with and solicit the input of, but not limited to: a) appropriate federal, state and local agencies and local officials, b) owners of both private and public land abutting the river, c) business interests located on the river, d) interested residents of Hingham and Weymouth" (Weymouth Back River Study 1979).

The Back River Committee played a key role in working with Hingham and Weymouth and DMF to identify and clean up the pollution sources on the river in order to reopen the shellfish beds. The committee also initiated the state designation in 1982, as an Area of Critical Environmental Concern, and is currently in the process of organizing a management plan for the Weymouth Back River ACEC. This management plan is intended to address current and future issues regarding the Back River ACEC. The Back River Committee has taken it upon themselves to work seriously for the preservation and protection of the Back River for future generations.

Bare Cove Park Committee
The Bare Cove Park Committee is responsible for managing Bare Cove Park. The committee and staff are currently volunteers. The committee works in conjunction with the Back River Committee and is looking into writing a management plan for Bare Cove Park.

Weymouth Parks Department - Great Esker Park
Great Esker Park is under the management of the Weymouth Parks Department. The park is staffed by one year-round ranger, with an additional staff person during the summer. Great Esker has a Nature Center at the parks main entrance and holds summer programs for youth.

Hingham/Weymouth

CONSERVATION COMMISSION

The Conservation Commissions are responsible for the enforcement of the state Wetlands Protection Act and the local wetlands protection bylaw and regulations. The Hingham Conservation Commission is responsible for managing the Hingham side of the ACEC, including More-Brewer Park and Bouve Pond. The Hingham Conservation Agent with the help of the Open Space Committee recently completed a 1996 Open Space Plan for the town of Hingham. In Weymouth the Herring Run Warden and two assistant wardens come under the jurisdiction of the Conservation Commission. The Conservation Administrator position was established in 1977. The Commission proposed and passed the Wetlands Protection By-Law in 1985. The bylaw is administered by the Commission in conjunction with the state Wetlands Protection Act.

DEPARTMENT OF PUBLIC WORKS

In Hingham, the Department of Public Works manages the sanitary landfill. They are in the process of capping one half of the landfill, due to be capped in October, 1996. The remaining half is scheduled to be capped in 1998. In Weymouth, the Department of Public Works is funding a Comprehensive Site Assessment for the Wharf Street Landfill abutting the Back River.

PLANNING BOARD

The local Planning Boards are responsible for enforcing the local zoning bylaw and site plan review under the Zoning Act and for review and approving subdivision under the Subdivision Control Act. The Weymouth Planning Board has more enforcement power, while in Hingham, the Planning Board has a more advisory role.

BOARD OF HEALTH

The local Boards of Health are responsible for regulating on-site wastewater disposal under the Title 5 of the State Environmental Code and reviewing subdivisions under the Subdivision Control Act.

State Agencies

ACEC Program - Department of Environmental Management

The Area of Critical Environmental Concern program is within the Department of Environmental Management. This program was set-up to foster coordination, cooperation and participation among state, local and regional agencies and citizens to protect outstanding natural resources which have been designated by the Secretary of Environmental Affairs. The ACEC program is providing assistance to the Back River Committee to help Hingham and Weymouth develop a Resorce Management Plan for the ACEC.

Division of Marine Fisheries

The Division of Marine Fisheries is working with the Back River Committee and the two towns of Hingham and Weymouth to reopen the shellfish beds in the Back River. DMF does monthly

water quality testing in the Back River and has written a Sanitary Survey for the Weymouth Back River. This survey is required by federal regulations in order to reopen a closed shellfish bed area.

Massachusetts Coastal Zone Management
MCZM is providing technical assistance to the town of Hingham for the development of a harbor plan. MCZM is also contributing to the management plan process by working with the ACEC program and the Back River Committee.

Massachusetts Bays Program
Massachusetts Bays Program (MBP) is a partnership of federal, state and local governments that is about to complete a five year assessment and planning effort that will conclude with a Comprehensive Conservation and Management Plan for Massachusetts and Cape Cod bays. The plan is meant to coordinate action aimed at restoring and protecting water quality and the natural resources of the Massachusetts Bays. The MBP is also involved with the Shellfish Bed Restoration Program.

Shellfish Bed Restoration Program
MBP is also collaborating with several other state agencies including DMF on the Shellfish Bed Restoration Program (SBRP). This program was organized to identify and mitigate nonpoint source pollution from specific storm drains which are now causing shellfish bed closure or threatening open beds. One area of shellfish beds in the Back River have been designated a SBRP site (See Water Quality section).

Land Use and Regulatory Control

ACEC Land Use Summary

The Weymouth Back River ACEC is approximately 954 acres in size. About 60 percent of the ACEC is located in Hingham and 40 percent in Weymouth. The ACEC is located in three USGS/MBP Drainage Subbasins. These subbasins are part of the Boston Harbor drainage basin called the Weymouth and Weir River. Approximately two-thirds of the ACEC, including the Back River, Bare Cove Park and Great Esker Park, are contained within one subbasin. More-Brewer Park and Bouve Pond are contained within the other (See Figure 9). Activities, outside and upstream of the ACEC, can and do have an impact on the Weymouth Back River ACEC. Existing and potential future land uses within the ACEC and within the sub-drainage basins surrounding the ACEC, for both Hingham and Weymouth can have water quality impacts on the ACEC resources.

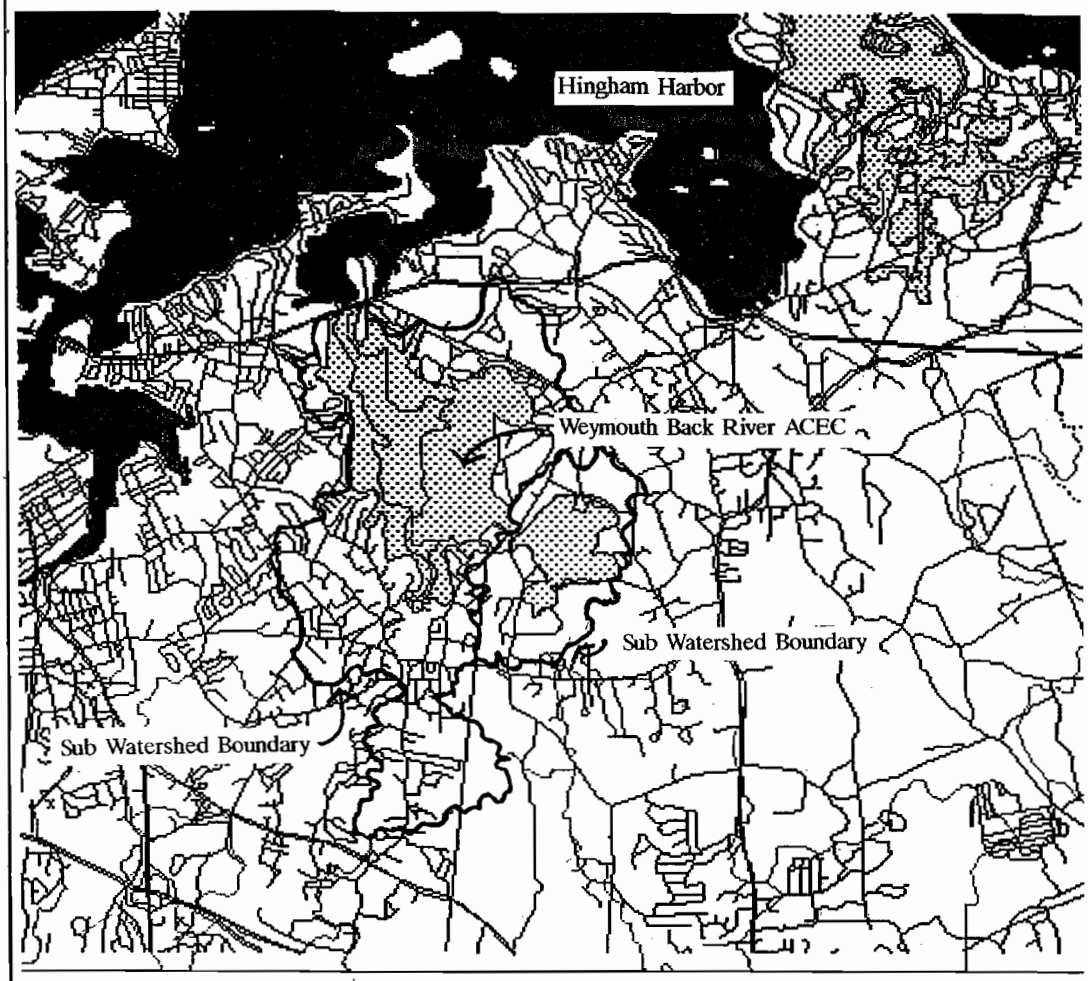
The following land use descriptions are based on the Hingham and Weymouth Zoning maps and a 1985 Hingham Land Use map from the 1995 Hingham Open Space Plan and a 1985 Weymouth Land Use map produced by the Massachusetts Bays Program and Applied Geographics Inc (Figure 10). The statewide source for land use data in Massachusetts is what is commonly referred to as the "MacConnell Land Use Data" compiled at the University of Massachusetts. The data and maps are based on interpretation of aerial photographs. The maps have a minimum parcel size of three acres and a resolution of one acre.

Approximately 76% of the ACEC is public open space. The designated open space lands include three town-owned parks, Bare Cove, More-Brewer Park/Bouve Conservation Area [Hingham] and Great Esker Park [Weymouth]. Of the ACEC's 954 acres, 590 acres in Hingham and 139 acres in Weymouth are publicly owned open space. On the Hingham side, land use is primarily open space, with some urban open land on the northern bank of the river. Most of the open space is forest of saltwater and freshwater wetlands. On the Weymouth side, almost all the land contained within the ACEC is public open space with the exception of the Herring Brook.

Table 2 provides a tabular summary of land use within the ACEC for both Hingham and Weymouth and is based on 1985 land use data. Also, included is a summary of land use within two of the drainage subbasins. Based on the land use data, 98 percent of the acreage in the ACEC is undeveloped and 60 percent of the subwatersheds are undeveloped. Undeveloped land in the ACEC is primarily forest (41 percent) and water (27 percent). Undeveloped land in the subwatersheds are also primarily forest (32 percent) but, developed land uses, primarily residential (31.5 percent) comprise 40 percent of the areas land use.

Regulations

Planning and regulation of land use and development falls primarily to local government. Development in the ACEC is regulated by local boards under state enabling acts including the Zoning Enabling Act, the Subdivision Control Act, the Wetlands Protection Act and Title 5. Enforcement and interpretation of these regulations is carried out by local boards such as the Planning Board, the Zoning Board of Appeals, the Conservation Commission and the Board of



WEYMOUTH BACK RIVER ACEC

Back River Subwatershed Boundaries

FIGURE 8

Legend

Sub Watershed Boundary

Weymouth Back River ACEC

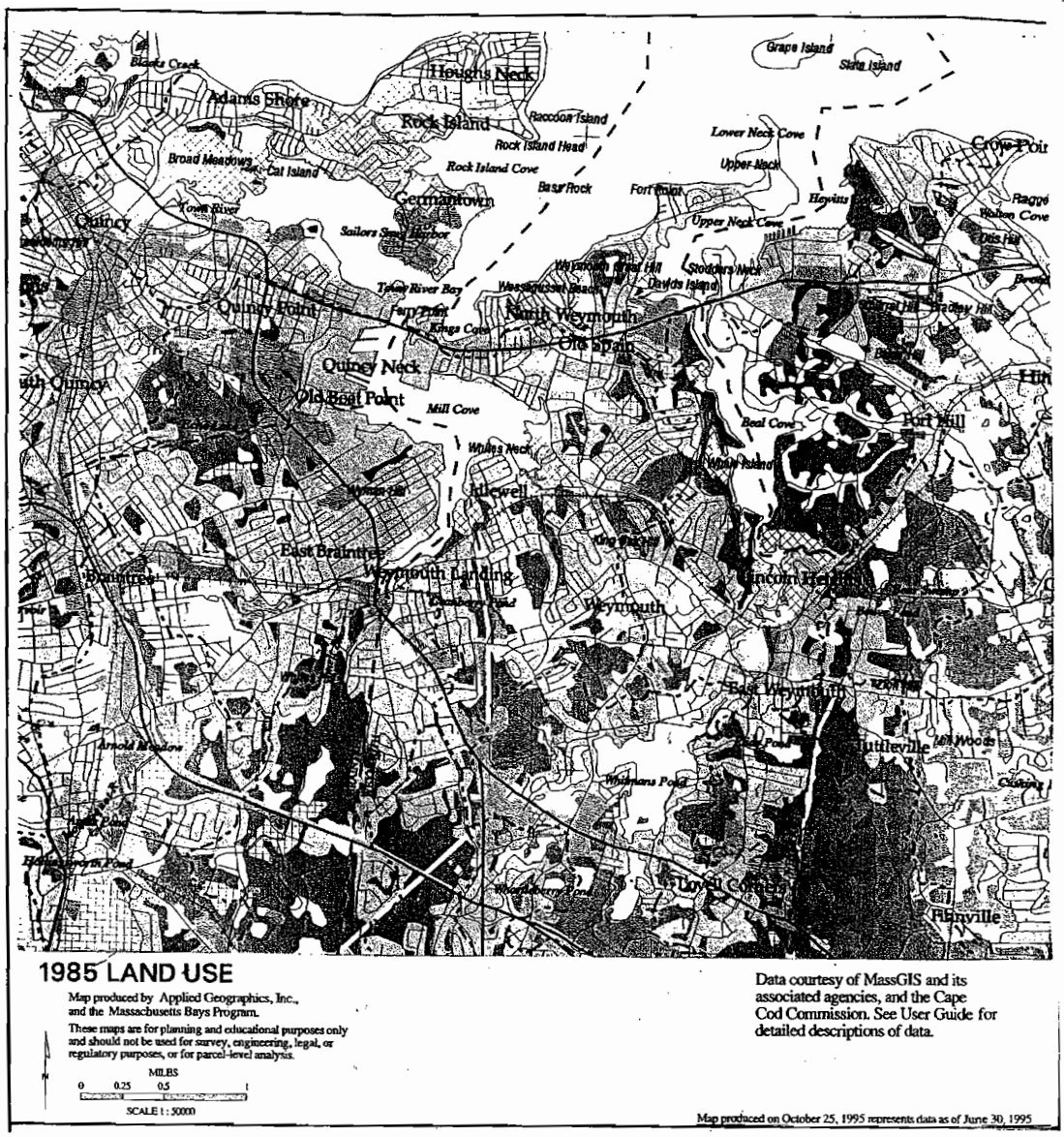
Boston Harbor

Table 2
Summary of Land Use within the ACEC for Hingham and Weymouth -1985

Land Use	Percent - ACEC	Percent - Watershed
Undeveloped Land Uses		
Forest	41% (391 acres)	32% (873 acres)
Wetland	8% (74 acres)	3% (82 acres)
Open/Urban Land	22% (210 acres)	15% (409 acres)
Water	27% (258 acres)	10% (273 acres)
Total Undeveloped Land Uses	98% (933 acres)	60% (1637 acres)
Developed Land Uses		
Residential	1% (11 acres)	31.5% (860 acres)
Commercial	.5% (6 acres)	2% (56 acres)
Industrial	0	.6% (17 acres)
Transportation	0	2.7% (74 acres)
Recreation	.5% (4 acres)	2% (58 acres)
Waste Disposal	0	1% (28 acres)
Total Developed Land Uses	2% (21 acres)	40% (1093 acres)
	*ACEC is 34% of land area of the watershed	
Total Land Use	100% (954 acres)	100% (2730 acres +/-)

Health. Many local communities adopt regulations which strengthen the minimum state requirements or they adopt new bylaws to address such issues as stormwater pollution, underground storage tanks or hazardous materials.

In understanding local regulations it is important to take in to consideration that zoning bylaws and subdivision regulations address new development only. Local zoning bylaws must be adopted



1985 LAND USE

Map produced by Applied Geographics, Inc., and the Massachusetts Bays Program.

These maps are for planning and educational purposes only and should not be used for survey, engineering, legal, or regulatory purposes, or for parcel-level analysis.

MILES
0 0.25 0.5 1
SCALE 1 : 50000

Data courtesy of MassGIS and its associated agencies, and the Cape Cod Commission. See User Guide for detailed descriptions of data.

Map produced on October 25, 1995 represents data as of June 30, 1995

WEYMOUTH BACK RIVER ACEC

Land Use

FIGURE 9

Legend

- Interstate Highway
- U.S./State Routes
- Secondary Road
- Town Boundary
- USGS Major Drainage Basin
- USGS/MBP Drainage Subbasin
- Ponds & Streams
- Cropland
- Pasture
- Forest
- Freshwater Nonforested Wetland
- Mining
- Open Land
- Recreation
- Residential Multi-Family
- Residential < 1/4 Acre
- Residential 1/4 to 1/2 Acre
- Residential > 1/2 Acre
- Salt Wetland
- Commercial
- Industrial
- Urban Open
- Transportation
- Waste Disposal
- Water
- Woody Perennial

by a two-thirds majority of town meeting. Subdivision regulations are passed by the Planning Board and wetlands regulations by the Conservation Commission. General bylaws (such as wetlands bylaws, hazardous materials bylaws and erosion control bylaws) are adopted by a simple majority at Town Meeting.

Zoning

Zoning bylaws establish districts within which certain uses are allowed as of right or, if they meet specified criteria, allowed by special permit. Zoning bylaws also control density, the amount of impervious surface allowed on a lot, and the percentage of a lot that must be maintained in landscaping or natural vegetation. Both Hingham and Weymouth have adopted zoning overlay districts, which provide protection for specific resources such as aquifers and floodplains. These overlay districts add additional development regulations to the underlying zoning district requirements.

Hingham's and Weymouth's zoning bylaws contain regulations for a floodplain and watershed protection district. These districts restrict development or alteration of areas subject to flooding by rivers and streams. The floodplain district protects against flood damage and, by pushing development away from water courses, adds some protection for water quality, fisheries and local marine life. The Zoning Board of Appeals may grant special permits for certain limited uses of areas within the flood plain, and may permit any use allowed in the underlying zone if the site is found not to be in the floodplain and if the proposed use is compatible with the district's purposes. However, only the floodplain overlay district is applicable to the land within the ACEC.

Zoning bylaws also may contain provisions to regulate specific impacts of development (i.e., sedimentation and erosion) or specific aspects of development (i.e., parking facilities). Zoning bylaws also contain provisions for review of site plans for projects not subject to subdivision regulations. Open Space Districts prevent residential and commercial development of certain land already dedicated to public open space, institutional or water supply use, while allowing institutional and agricultural uses. The district will restrain future diversion of open space to other uses.

Zoning Within the ACEC

Abutting land use zoning in Hingham is urban open space and residential. Bare Cove Park, the largest public open space in the ACEC, is bordered by residential developments such as Conservatory Park and single family housing. In Weymouth, abutting land use zoning ranges from general and planned industrial, to general and limited business, to residential and open space. The area zoned limited business is a shopping center located at the far northern tip of the ACEC next to the Route 3A bridge. Great Esker Park, the second largest public open space in the ACEC, is bordered primarily by residential zoning districts. Several acres zoned as a planned industrial park is located in the vicinity of the Weymouth landfill. An area zoned general industrial and includes the MA Electric Company is located at the head of the Back River. Land zone general business and residential zoning abutts the Herring Brook up to Whitman's Pond dam (Weymouth Zoning Map, Figure 12).

Table 3
Underlying Zoning in the ACEC

Zoning Type	Percent of Study Area	Total Acres
Low Density Residential	14%	132
High-density Residential	1%	9
Commercial/Office Park	1%	10
Industrial	2%	16
Public and Open Space	57%	546
(Open Water)	(25%)	(241)

Hingham Zoning Bylaw

The Rules and Regulations of the Planning Board and the subdivision regulations were last updated in 1995. There is no town master plan. Some studies were completed in 1960 which serve as the basis for some of the regulations. Traditionally the zoning map and bylaws serve as the town master plan (Cox, 1996). The "Zoning Map of the Town of Hingham, Massachusetts, (Part A, April 2, 1983 (Figure 11) and Part B, 1975)" is shown by two plans now on file in the office of the Town Clerk.

Use Regulations

There are six underlying zoning districts within the Hingham portion of the ACEC. Table 3 provides the number of acres, min. lot area and maximum building coverage for each of the five districts. The zoning bylaw includes an watershed protection district but the ACEC is not included in this district. A flood plain district, a part of the zoning bylaw, includes area in the ACEC (see Figure 4). The locations and boundaries are shown on a map entitled, "Zoning Map of the Town of Hingham, Massachusetts, Part B- Flood Plain and Watershed Protection District, 1976", and on the Hingham Flood Insurance Rate Map (FIRM) dated June 3, 1986, as amended. The Health Board has jurisdiction over environmental controls such as the water supply, wetland setbacks for Title V, and hazardous materials regulation.

Site Plan Review (sec. V-F)

Hingham's zoning bylaw includes provisions for Site Plan Review. Site plan approval is required for all new construction or expansions of non-residential buildings. This includes parking areas. The Zoning Board of Appeals receives all applications for special permit review. When variances to the zoning bylaw are required, the Planning Board is asked to provide recommendations. It depends on the site and the size of the project as to whether site plan review is required. Site Plan review is required for a special permit for uses in "A2" and for any development or building expansion costing $5,000 or more. The Board of Appeals and/or the Planning Board may employ professional consultants to review a proposal. There is no town engineer.

Requirements for site plan review as listed in the bylaw (V-F) include assurance of positive storm-water drainage and snow-melt run-off from the driveways and from all parking and loading areas on the site. Site plans must show subsurface and surface drainage facilities. Site plan regulations do not include standards and guidance for prevention of water pollution or

environmental criteria related to water quality or preservation of significant natural features. The regulations include a special section on light industrial uses allowed in office parks. These businesses could be sources of environmental pollution. Adding environmental design criteria to this section could help ensure that safeguards are integrated into proposed developments to protect environmental features (For guidance see new DEP Stormwater Management Standards).

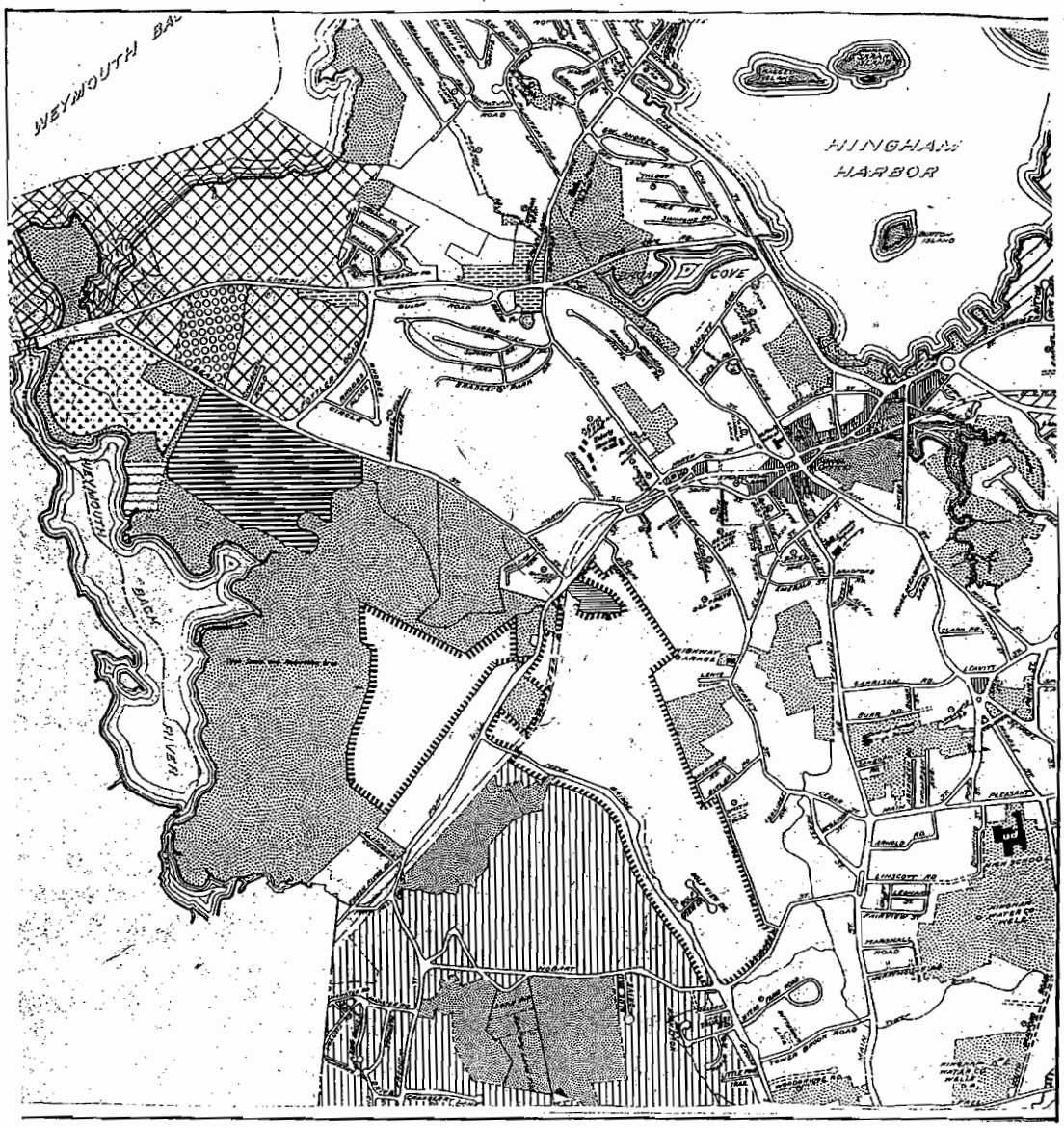
Table 4
Zoning Districts within the Hingham ACEC

District	Acres in ACEC	Min. Lot Area (Sq.Ft.)	Max. Coverage by Buildings
Residence B	**102**	**30,000 sq.ft.**	**-**
Residence D (Town House)	**2**	**5,000 sq.ft.**	**20%**
Residence E	**7**	**30,000 sq.ft.**	**-**
		(10,000 sq.ft. PUD,	**20%**
		5,000 sq.ft. town house)	**20%**
Office Park	**10**	**5 Acres**	**Floor area ratio 0.15**
Waterfront Recreation	**7**	**3 Acres**	**20%**
Official and Open Space	**321**	**-**	**10%**

Floodplain District (Sec.III- C)
The Hingham zoning bylaw creates a Flood Plain zoning overlay district. The floodplain district includes all areas in the town at or below 10 MSL and all special hazard areas designated as Zone A, A1-30, V, V1-30, on the FIRM by FEMA whether delineated on the town zoning map or not (See Hingham Floodplain map for more detail, Figure X). No new construction or alterations are allowed within the district. Dumping, filling and excavating is also prohibited. Certain uses are allowed such as conservation, recreation, forestry, grazing and other accessory uses. Certain uses in single residence districts are allowed with a special permit such as parks, and other appropriate municipal uses. Buildings and dwellings built before January 1, 1969 are also exempt from these provisions.

The federal floodplain district guidelines focuses on ensuring that structures within the district are properly floodproofed and that activities within the floodway do not result in increases in flood-levels of the 100-year flood. Dumping, filling, excavating or transferring of any material which will reduce the natural food-water storage capacity or interfere with the natural flow patterns of any water course within the overlay district is prohibited.

Some areas in town which have been subject to possible flooding are North and South Streets. But, these areas are not in the ACEC drainage basin.



WEYMOUTH BACK RIVER ACEC

Hingham Zoning

FIGURE 10

Legend

- RESIDENCE A
- RESIDENCE B
- RESIDENCE C
- RESIDENCE D
- RESIDENCE E
- RESIDENCE F
- BUSINESS A
- BUSINESS B
- BUSINESS RECREATION
- WATERFRONT BUSINESS
- INDUSTRIAL
- INDUSTRIAL PARK
- OFFICE PARK
- WATERFRONT RECREATION
- OFFICIAL AND OPEN SPACE
- LIMITED INDUSTRIAL PARK

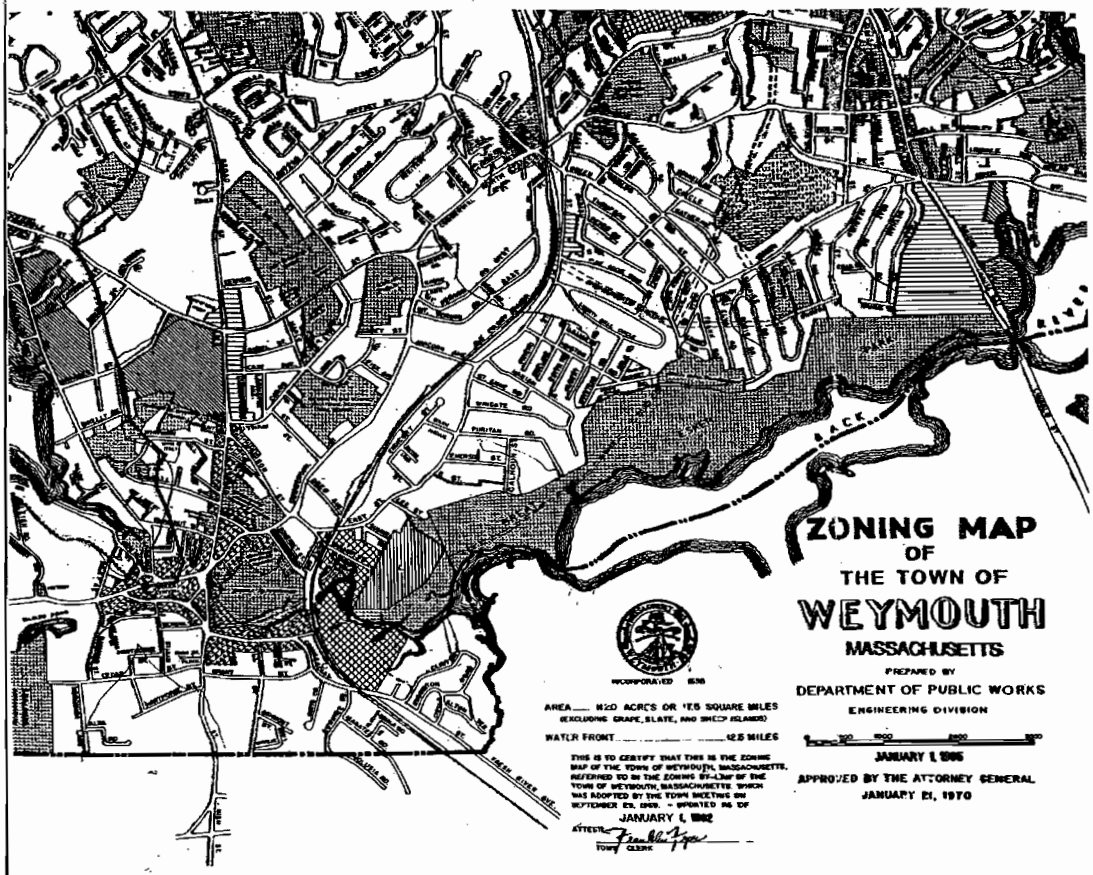
Off-street Parking(sec. V).
Off-street parking regulations include language regarding parking dimensions and provision of adequate storm drainage in all commercial, institutional, or multi-family parking areas, but not water quality protection. The zoning bylaw does allow for a reduction in the number of parking spaces constructed by allowing developments to share parking spaces.

Special Permit Review (sec IV-D,E and H)
The criteria for granting special permits includes consideration of more efficient use of land in harmony with its natural features, encouragement of the preservation of valuable open space and protection of water bodies and supplies, wetlands, floodplains, agricultural lands, wildlife and other natural resources. Development options requiring special permits are residential cluster development and townhouses in residence district D. The special permit provides protection of existing public ways, parks streams or rivers abutting townhouse developments, by requiring that no land may be paved within a strip of land one hundred (100) feet wide adjacent to these existing uses.

Earth Removal Regulations (sec V-E)
Earth removal regulations require that such operation will not have a material adverse effect on the water supply, health or safety of persons living in the neighborhood or on the use of or amenities of adjacent land. This section does not address water quality or specific environmental concerns. The application for the permit must be accompanied by a plan which shows the proposed drainage (both temporary and permanent) including calculations.

Weymouth Zoning Bylaw
The zoning bylaws, map and town Master Plan were first adopted in 1964 with the latest revisions made in 1994. A Waterfront Plan was written in 1980 which includes the Back River. The Town Master Plan, Zoning Map and Bylaws serve as the basis for Planning Board decisions and Special Permit Review. In Weymouth, the Planning Board is not simply an advisory board to Zoning Board of Appeals (as is the case in Hingham) but has been granted direct decision making powers for Site Plan Approval and Special Permit reviews. The "Zoning Map of the Town of Weymouth, Massachusetts, 1969" is on file in the offices of the Town Clerk. The purposes of the Zoning Bylaw include: to secure safety from fire, flood, panic and other dangers and to conserve the value of land and buildings, including conservation of natural resources and the prevention of blight and pollution of the environment. The bylaw "includes but is not limited to restricting, prohibiting, permitting or regulating: uses of land, including wetlands and lands deemed subject to seasonal or periodic flooding.

Use Regulations
There are three underlying zoning districts within the Hingham portion of the ACEC. Table 5 provides data on the number of acres, minimum lot area and maximum building coverage for each of the three districts. The zoning bylaw includes a Watershed Protection District (Article IIIA, approved 1985) as an overlay district, but the ACEC is not located within this district. The purpose of this district (as it could relate to the ACEC) is to preserve and protect the lakes,



WEYMOUTH BACK RIVER ACEC

Weymouth Zoning

FIGURE 11

Legend

L INDICATES RIGHT ANGLE
--- LINES MARKED WITH DOTS FOLLOW EXISTING LOT LINES

- NEIGHBORHOOD CENTER DISTRICT NCD
- WATERSHED PROTECTION DISTRICT
- PLANNED OFFICE PARK POP
- RESIDENCE DISTRICT R-1
- RESIDENCE DISTRICT R-3
- RESIDENCE DISTRICT R-4
- LIMITED BUSINESS B-1
- GENERAL BUSINESS B-2
- LIMITED INDUSTRIAL I-1
- GENERAL INDUSTRIAL I-2
- RESIDENCE DISTRICT R-2
- HIGHWAY TRANSITION DISTRICT HT
- MEDICAL SERVICES DISTRICT MSD
- PLANNED INDUSTRIAL PARK PIP
- PUBLIC, SEMI-PUBLIC & OPEN SPACE POS

ponds, streams, brooks, marshes, swamps, bogs and other water bodies and watercourses in the town, protect the community from detrimental use and development of land and waters within the district, and conserve the watershed areas of the Town of Weymouth for the health, safety, welfare and enjoyment of its people. A Zone II, and a Groundwater Protection District have been established but these are primarily to protect the town's drinking water supply. The Weymouth Back River is not included with these districts.

A Flood Plain District, a part of the zoning bylaw includes area in the ACEC (see figure 5). The locations and boundaries are shown on the Weymouth Flood Insurance Program, FIRM, Flood Insurance Rate Maps," effective 1989. The Health Board has jurisdiction over environmental controls such as the water supply, wetland setbacks for Title V, and hazardous materials regulation.

Table 5
Zoning Districts within the Weymouth ACEC

District	Acres in ACEC	Min. Lot Area (Sq.Ft.)	Max. Coverage by Buildings
Residence R-1 (low density)	**30**	**15,000 sq.ft.**	**30%**
General Industrial	**16**	**-**	**60% paved & buildings 20% landscaped**
Public facilities and Open Space (POS)	**219**	**-**	**75% paved & buildings 25% landscaped**

Site Plan Review (Article XXVA, approved 1993)
Site Plan approval is required for all new construction or expansions of residential buildings of three-family or more dwelling units and nonresidential development. However, there are no standards and guidance for prevention of water pollution, quality and other environmental resources. The Site Plan Review authority is the Planning Board,

Floodplain District (Article XIIA, approved 1990)
The floodplain district was first adopted in 1980 and substantive revised in 1980, and uses the FEMA map boundary. No building or filling is permitted in the floodway and a special permit is required to build in the Zones A and V (see FEMA map and Floodplain section for more detail). There are also construction criteria for floodplain special permits. Special permits are used in the Floodplain District with special criteria for construction to provide protection against flooding.

Cluster Development
Cluster development in residential districts is allowed under the zoning bylaw not typically used in the design of new developments. A 25,000 acre lot is allowed in a watershed district. The lot

size may be reduced to 20,000 acres, if open space is set aside, but the density cannot be increased. They also have provisions for Planned Unit Developments (Clark) where the minimum land area required is two acres.

Portion of Lot in a Wetland Area (Article XV, Dimensional Requirements, Section 120-53.1)
The Weymouth Zoning bylaw has a general provision called "Portion of lot in wetland area (approved 1986). This section allows that a portion of a lot subject to protection under the Wetlands Protection Act (MGL 131.40) and defined as a wetland area may be used to satisfy the minimum area and yard requirements for that particular zoning district. This requirement was established to provide usable upland areas for building and protecting wetlands from encroachment.

Earth Filling (Article XX)
This section requires that the applicant meet all requirements of the Wetlands Protection Act.

Parking Regulations
The off-street parking regulations do not include performance criteria. The general requirements included are that areas must be smoothly graded, properly drained and treated with bituminous or other all-weather hard surface.

Subdivision Regulations
Subdivision regulations are local ordinances that regulate the conversion of undivided land into building lots for residential and other purposes. They govern the development of sites which are subject to the Subdivision Control Act and typically include technical requirements for layout of roads, utilities, drainage, etc. Site standards vary from municipality to municipality and may range from the simple laundry list approach to detailed and exacting specifications. In recent years, many communities in Massachusetts have added environmental performance requirements to their subdivision regulations.

Hingham Subdivision Regulations
Hingham's subdivision regulations were last amended in May of 1995. For the most part the regulations do not include standards or criteria for the protection of water quality and other environmental resources. One of their purposes are for securing adequate provision compatible with natural features existing as of the date of submission of a subdivision plan for approval for protection of water resources, flood control, wetland areas, for example. and for protecting, promoting and enhancing the natural beauty and amenities of the Town. There is an overarching statement about protection of natural features (sec. 4J)"Due regard shall be shown for all natural features, such as large trees, water courses, scenic points, historic spots and similar community assets which, if preserved, will add attractiveness and value to the subdivision or to the town." This statement does not include water resources or environmental resources specifically.

One of the few environmental requirements is that all subsurface drains and storm drains and systems shall be constructed in a manner which will ensure their complete compatibility with the

existing town municipal services, wetland resources and flood plain areas and waterways." (section 4C(1)) There is a requirement that the side slopes of detention areas be placed beyond the limits of wetland and floodplain resource areas and above high groundwater elevations. There is no further description of how to meet these standards.

The subdivision regulations include a section on Open Drainage Systems (section 4D) and Detention Areas (section 4E). "Open drainage systems of swales, ridges and slopes shall be designed to fit the natural contour of the land as much as possible. Disturbed land shall be landscaped to conform to the surrounding area and planted to eliminate the possibility of erosion and siltation." Stormwater detention areas "shall be constructed of natural earth materials with loam and seed surface treatment. The detention areas shall be designed to blend into the existing topography."

Drainage Calculations (Section 3C(2)(j))
Hingham's Subdivision Regulations requires that the definitive subdivision plan include drainage analysis and calculations to substantiate the adequacy of the proposed drainage system within and outside of the subdivision together with the existing town municipal services and waterways to be utilized for discharge from the subdivision.

Sedimentation and Erosion
Detention basins are required to minimize erosion and sedimentation in new development projects. This is a part of the 1995 update of the Rules and Regulations of the Planning Board. Detention/retention basins must meet the flow and volume for the 100-year and 10-year floods for 24 hours. Wetlands can be used as a discharge area, but no wet ponds [standing water] are allowed. There is no escrow requirement for maintenance of these systems after they are built and the basins are maintained by the Fire Department (Cox).

Weymouth Subdivision Regulations
Weymouth's Subdivision Regulations were first adopted in 1954 and were last revised in 1994. In Section 1.1 Purpose of the Subdivision Rules and Regulations do not list protection of natural resources, water resources, wetlands or other environmental resources. The subdivision regulations require an Environmental Impact Statement for subdivisions with greater than 20 lots and "non-residential subdivisions" but they do not include standards or criteria for the protection of water quality and other environmental resources.

There is an overarching statement about protection of natural features (section 5.9) that reads: " Due regard shall be shown for all natural features, such as trees, wooded areas, water courses, scenic points, historic spots, and similar community assets, which if preserved, will add attractiveness and value to the subdivision." The removal of trees over six inches in diameter requires approval from the town.

Plans which do not require approval under the subdivision control law, may be submitted as ANR (Approval Not Required) or Form A Plans. Buildings of 5,000-10,000 square feet and 20,000

square feet are required to show all drainage structures and subsurface systems. Design requirements exist for Open Space, protection of Natural Features and 100-year Floodplain criteria. Construction requirements exist for sewerage and storm drain systems as well (see Conservation Commission Rules & Regulations for more detail).

Environmental Impact Statement
An Environmental Impact Statement (EIS) must be submitted with the definitive plan (section 4.3.3) for all subdivisions containing 20 or more dwelling units and for all nonresidential subdivisions in the business district. According to the regulations, the EIS "shall clearly and methodically assess the relationship of the implementation of the proposed development to the natural and man-made environment of the town. The statement shall utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in the planning and designing of the proposed development." The EIS concerning the character of the subdivision shall contain four (4) sections: 1) the environmental impact of the proposed development; 2) any adverse environmental impacts which cannot be avoided should the proposed development be implemented; 3) alternatives to the proposed development which are expressly allowed or allowed by permit by the Zoning Bylaw; and 4) all measures available, and those measures to be used to minimize adverse environmental impacts (or maximize beneficial impacts).

The Environmental Impact Statement shall address the following elements: physical, transportation, public utility, and neighborhood and community, socio-economic, aesthetics, master plans, and municipal benefit/cost. The physical element will consist of the following sub-elements: air pollution, noise pollution, surface and sub-surface water pollution, soils (dangers of erosion and sedimentation), and general ecology. General ecology addresses the relationship of the proposed development to the major botanical, zoological, geological and hydrological resources of the site and adjacent to the site (where deemed appropriate by the Board) (section 4.3.3.a.). The public utility section addresses sewage treatment, storm water drainage and solid waste (section 4.3.3.c.).

Stormwater Management
Parking regulations prohibit any increase in peak runoff and the use of detention/retention basins are currently required but are being reviewed by the Planning Board (see Wetlands by-law). Storm drainage provisions also require catch basins, hoods and gas traps (section 6.7). However, these provisions do not address water quality except to require adequate control of erosion.

Drainage Calculations (section 4.3.1)
Weymouth's Subdivision Regulations requires that the definitive subdivision plan include drainage analysis and calculations for the ten (10) year frequency storm for cross culverts with drainage areas of ten (10) acres or less and a twenty-five (25) year frequency storm for cross culverts with drainage areas in excess of ten (10) acres. The drainage design shall be based on this information with the use of the rational formula (Q=CIA). The drainage calculations shall be for all drainage areas within and affecting the subdivision. The plan shall also show the flow path followed by all drainage discharging from the subdivision to the primary receiving water

course or body of water.

Environmental Controls
Improvements to minimize environmental impact shall be installed in accordance with the approved definitive plan and/or follow procedures as contained in "Erosion and Sedimentation Control Guidelines", by the Commonwealth of Massachusetts, Department of Environmental Conservation and with consultation with the Weymouth Conservation Commission.

Wetlands Bylaw and Regulations
Because the ACEC includes a vast amount of significant wetland resources, one of the most important measures that Hingham and Weymouth can take to protect the ACEC is the strong enforcement of state and local wetlands regulations. State wetland regulations prohibit the destruction or impairment of Bordering Vegetated Wetlands located within an ACEC. The exception to this is maintenance of stormwater detention, retention, or sedimentation ponds or to maintain stormwater energy dissipating structures that have been constructed in accordance with a valid Order of Conditions.

One of the most effective means of protecting wetlands and local water bodies is a wetland or riparian buffer zone. Both Hingham and Weymouth have adopted wetland setbacks which are more stringent than the state Wetlands Protection Act. More specific protection of critical resources could be accomplished by including a provision specifically for protection of the ACEC.

This section reviews local wetlands bylaws and Rules and Regulations adopted by the Conservation Commissions of Hingham and Weymouth to implement these bylaws. These bylaws and regulations are reviewed with an emphasis on provisions that: 1)are more stringent than state standards; and 2)help protect the ACEC.

Hingham Wetlands Bylaw and Regulations
Hingham has a local Wetland By-Law which is currently under revision. The by-law is under revision for internal consistency, to establish and coordinate setbacks, to add vernal pools and to revise and clarify definitions. The local by-law is more stringent than the state Wetlands Protection Act (MGL 131.40) because it establishes setback limits and requires a Notice of Intent for any activity conducted within the 100 foot wetland buffer zone.

Wetlands Bylaw (Article XV-H, General Bylaws)
Hingham's Wetland bylaw controls activities deemed to have a significant effect on wetland and water quality values. The values protected by the Hingham bylaw (Article 22) are:

a. public water supply
b. private water supply
c. groundwater and surface water supply
d. flood control
e. erosion control
f. storm damage

g. water pollution
h. shellfish
i. fisheries
j. wildlife
k. recreation
l. aesthetics

Additional resources protected by the new bylaw (sec. 10.02(1)) are vernal pools.

The bylaw allows exceptions for existing electric, gas, water, telephone or telecommunications services.

Conservation Commission Rules and Regulations
Stormwater Management
Direct discharge of stormwater into any resource area is not allowed in most new developments. However, previously installed systems can not be removed and in some instances the Planning Board will allow direct discharge as a trade off for a concession or an easement. Stormwater treatment prior to discharge consists of sumps and gas traps followed by a required maintenance program. Presently there is no perceived need to review this requirement.

Wetlands Setbacks
Minimum setback requirements are listed in the by-law. They range from 20 feet for clear cutting, grading and/or filling to 50 feet for structures such as breezeways, porches and decks. Tree cutting plans are required for project review, as well as erosion control plans.
Note: The above mentioned setbacks fall under the 1987 By-law.

Policies
Hingham follows those water quality standards and best management practices as established by MA Coastal Zone Management and the MA Department of Environmental Protection. The town has underground storage tank by-laws under the jurisdiction of the Fire Department. Performance standards for variances are established as policy. The town does place continuing conditions that are recorded with the registry of deeds on the certificate of compliance.

Weymouth Wetlands Bylaw and Regulations
The town of Weymouth uses the original 1985 Wetlands Bylaw which was amended in 1995. In 1995 John Shea was hired to rewrite the regulations and very few changes were made. The Rules and Regulations are presently under revision.

Wetlands Bylaw (Chapter 119, Wetlands Protection)
The amended bylaw adds seven additional values not included in the MA Wetlands Protection Act. These values include:

- vernal pools,
- isolated land subject to flooding,

- intermittent streams: natural or man-made,
- land inundated by groundwater,
- erosion and sedimentation control,
- aquaculture, and
- recreation.

The bylaw is also more stringent than the state Wetlands Protection Act as it requires a 100 foot setback for the floodplain and isolated and bordering areas subject to flooding. Weymouth's bylaw controls activities deemed to have a significant effect upon wetland values. The bylaw does not list water quality specifically.

The bylaw, as in Hingham, allows exceptions for existing electric, gas, water, telephone or telecommunications services but, in addition includes normal maintenance or improvement of land in Agricultural Use.

The bylaw states that the Conservation Commission may require that the Order of Conditions be secured by a performance bond or deposit of money payable to the town or by a conservation restriction or easement recorded with the Registry of Deeds.

The bylaw lists a set of definitions for significant terms which include: alter, banks, land in agricultural use, normal maintenance or improvement of land in agricultural use and a qualifying wetland for example. A qualifying wetland is inland freshwater areas which are seasonally flooded basins or flats or inland fresh meadows. Altering is defined by the following actions:

- removal, excavation or dredging of soil, sand, gravel or aggregate materials;
- changing drainage characteristics, flushing characteristics, salinity distribution, sedimentation patterns, flow patterns and flood retention characteristics.
- drainage or other disturbance of water level or table.
- dumping, discharging or filling with any material which may degrade water quality.
- driving piles or erection of buildings or structures of any kind.
- placing of obstructions
- destruction of plant life, including cutting of trees.
- changing water temperature, biochemical oxygen demand or other physical or chemical characteristics of the water.

Conservation Commission Rules and Regulations

Direct discharge stormwater into a resource area is prohibited. No asphalt paving is allowed within 50 feet of a resource area, the runoff must be treated and certain design standards are adhered to. The first 25 feet "no-build" zone in the Bordering Vegetated Wetland (BVW) is presumed to be of primary concern and is regulated as though it were part of the resource area. Tree cutting plans are required and all trees over 6 feet must be shown on the plan. The plan must also be approved by the administrator. Similarly, erosion and sedimentation control plans are also required. The Conservation Commission has jurisdiction over the review of the discharge of runoff from parking areas.

Weymouth also places continuing conditions which are recorded with the registry of deeds on the certificate of compliance.

State Regulations

The general effects of ACEC designation are described in the ACEC regulations, 301 CMR 12.00 (see appendix). These regulations direct all state environmental agencies (EOEA agencies) to take actions, administer programs, and revise regulations in order to preserve, restore and enhance the resources of ACECs. The guidelines for implementing ACEC designation are not found in one set of laws or regulations. For example, several divisions of the Department of Environmental Protection (DEP) administer a wide variety of regulations, and some of these regulations contain specific provisions regarding ACECs (ACEC program guide).

The Massachusetts Environmental Policy Act (MEPA) (MGL c.30, s.61-62H)

The Massachusetts Environmental Policy Act (MEPA) Regulations provide a public review process to gather information and to avoid or minimize adverse environmental impacts regarding proposed projects undertaken directly by state agencies, projects funded by state agencies, or projects permitted by state agencies. Projects subject to MEPA review must file an Environmental Notification Form (ENF) with the Secretary of Environmental Affairs, through the MEPA Unit. Proposed projects within the boundaries of designated ACECs require MEPA review at more sensitive thresholds than projects outside of ACECs.

Wetlands Protection Act (WPA) (MGL c.131,s.40)

If the wetland resource areas within the ACEC are significant to the interests of the Wetlands Protection Act, then significance shall be presumed by local Conservation Commissions and DEP, and incorporated into the review of any proposed project. For coastal areas within an ACEC, the performance standard is raised to one of "no adverse effect" on the interests of the Act. except for maintenance dredging of "Land Under the Ocean" for navigational purposes. A higher performance standard also applies to the inland Resource Area known as "Bordering Vegetated Wetland" (BVW). Within an ACEC, the 5,000 square foot loss of wetland resource area or BVW is not allowed (ACEC Program Guide).

Waterways Regulation Program (MGL c.91)

The Waterways Regulation Program is administered by the Department of Environmental Protection (DEP) and regulates activities in both coastal and inland areas, including construction, dredging and filling in tidelands, great ponds, and certain rivers and streams. The regulations are based on Massachusetts General Law Chapter 91, which dates back to the earliest days of the Massachusetts Bay Colony. Anyone proposing to place fill, build structures, or dredge in tidelands or other areas subject to Chapter 91 jurisdiction must have a valid Chapter 91 license or permit.

The Waterways regulations require higher environmental standards for certain Chapter 91 projects located within ACECs, with the goal of protecting designated critical resource areas from unnecessary encroachment by fill and structures. The regulations do not allow new fill in ACECs. They also place increased limits on new structures. Higher standards are also required

regarding dredging and disposal activities within ACECs. Licenses for privately owned structures for water dependent use are only allowed only if they are consistent with a resource management plan for the ACEC.

Surface Water Quality Standards (MGL c.21,s.27)

The Surface Water Quality Regulations designate the most sensitive uses of waters of the Commonwealth, prescribe the minimum water quality critieria required to sustain these uses, and contain regulations to achieve these uses and maintain existing water quality. The most stringent antidegradation standards are reserved for waters designate as Outstanding Resource Waters (ORWs). The standards in the regulations are used to guide the issuance of surface water quality discharge permits and their subsequent implementation.

401 Water Quality Certification Program (MGL c.21, s.27(12))

Section 401 of the federal Clean Water Act requires that anyone proposing any activity that will result in a discharge to waters or wetlands is required to obtain a federal permit and state certification that the project will comply with applicable state water quality standards and other state laws. The DEP Division of Wetlands and Waterways administers the wetlands component of the 401 Program to streamline the administration of this program with the administration of the Wetlands Protection Act Regulations. Wetland 401 reviews are undertaken in conjunction with local Conservation Commissions as part of the administration of the Wetlands Regulations. In ACECs the 401 Program weighs several factors in making determinations for 401 water quality certification: compliance with the Wetlands Protection Act; minimization of individual and cumulative impacts; analysis of alternatives for certain projects; and compliance with the Massachusetts Surface Water Quality Standards (314 CMR 4.00), including protection of Outstanding Resource Waters.

Site Assignment Regulations for Solid Waste Facilities (310 CMR 16.00)

The regulations provide procedures and criteria for the siting of solid waste management facilities. They are divided into four parts, and describe the responsibilities and roles of local boards of health and DEP in siting solid waste management facilities. The siting of solid waste management facilities are prohibited within an ACEC. The regulations also prohibit the siting of a facility located outside of, but adjacent to the ACEC, if such a siting "would fail to protect the outstanding resources of an ACEC."

Weymouth Back River ACEC
Natural Resource Inventory

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January 1996

Massachusetts Species of Special Concern
Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
January 1996

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Pine DuBois
Hingham Conservation Agent

Tom Cox
Hingham Planning Board

William Woodward
Weymouth Conservation Agent

Jim Clark
Weymouth Planning Board

Mary Toomey

George Clark
Great Esker Park summer ranger

Dave Yashura
Division of Marine Fisheries/Shellfish Purification Plant, Newburyport

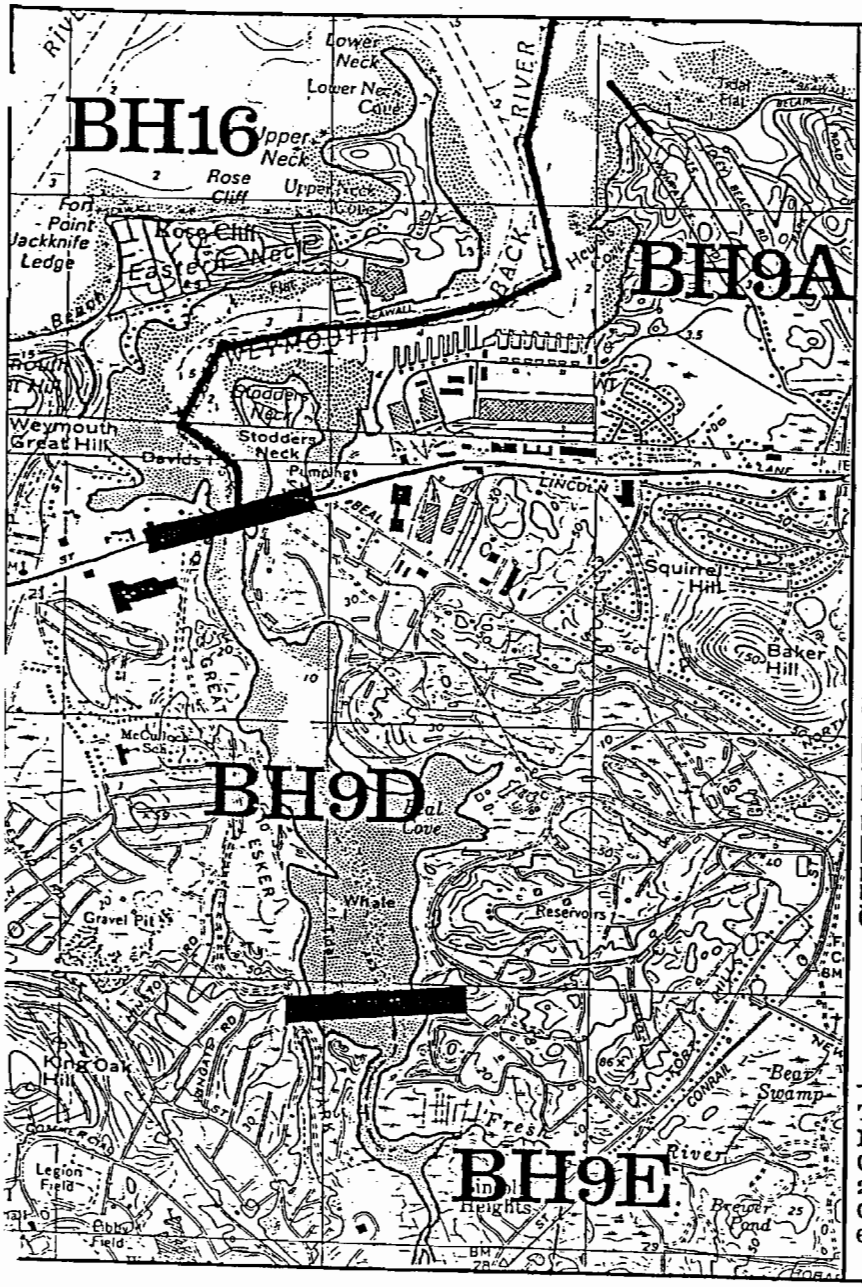
Mike Paxtus
Hingham Department of Public Works

Barbara Johnson
Back River Committee

Mike Doyle
Great Esker Park Ranger

Robert Buotte
Hingham Shellfish Constable

APPENDIX I - SHELLFISH BEDS



BACK RIVER MANAGEMENT PLAN

Weymouth / Hingham

FIGURE 5A

KEY

SHELLFISH BEDS

THE HENDERSON GROUP
222 Third Street
Cambridge, MA
617/494-0082

1989

APPENDIX II - AQUATIC VEGETATION

Table 19. *Checklist of Flora from Hingham Bay. 1970.*

Scientific Name	Common Name
ALGAE	
Class:	
Chlorophyceae	Green Algae
Chaetomorpha sp.	
Enteromorpha intestinalis	
Enteromorpha linza	green string lettuce
Ulva lactuca	sea lettuce
Class:	
Phaeophyceae	Brown Algae
Ascophyllum nodosum	rock weed
Ascophyllum mackaii	
Chorda filum	Devil's shoelace
Chordaria flagelliformis	
Fucus evanescens	rock weed
Fucus spiralis	flat wrack
Fucus vesiculosus	bladder wrack
Laminaria agardhii	kelp
Class:	
Rhodophyceae	Red Algae
Chondrus crispus	irish moss
Polysiphonia lanosa	
Porphyra umbilicalis	
Dasya pedicellata	red jabot laver
VASCULAR PLANTS	
Artemisia stelleriana	dusty miller
Aster tenuifolius	salt marsh aster
Atriplex arenaria	seabeach orach
Chenopodium sp.	goosefoot
Distichlis spicata	spike grass
Iva frutescens oraria	marsh elder
Juncus gerardi	black grass
Limonium carolinianum	sea lavender
Najas marina	bushy pondweed
Rhus typhina	staghorn sumac
Rosa rugosa	salt spray rose
Salicornia europaea	glasswort
Scirpus atrovirens	bullrush
Solidago sempervirens	seaside goldenrod
Spartina alterniflora	salt water cord grass
Spartina patens	high water cord grass
Suaeda maritima	sea blite
Triglochin maritima	arrow grass

APPENDIX III - NEW ENGLAND WILDLIFE CENTER
WILDIFE OF BARE COVE PARK AND BACK RIVER

TREATMENT, REHABILITATION, EDUCATION, ENVIRONMENTAL RESEARCH

Birds, Mammals, Reptiles and Amphibians of the Bare Cove Park & Back River

Birds

Snowy Egret
Great Egret
Cattle Egret
Ring-necked Pheasant
American Woodcock
Bobwhite Quail
Belted Kingfisher
Osprey (SC)
Great Horned Owl
Screech Owl
Short-eared Owl (E)
American Kestrel
Northern Harrier (T)
Sharp-shinned Hawk (SC)
Red-tail Hawk
Loggerhead Shrike (E)
Turkey Vulture
Herring Gull
Greater Black-backed Gull
Ring-billed Gull
Mallard Duck
American Black Duck
Hooded Merganser
Red-breasted Merganser
Goldeneye
Bufflehead
Canada Goose
Northern Cardinal
American Robin
Blue Jay
American Crow
Pine Siskin
Evening Grosbeak
American Redstart
Yellow Warbler
Great Crested Flycatcher
Prairie Warbler
Yellow-rumped Warbler
Black-throated Green Warbler

Birds, cont'd.

Brown Thrasher
Downy Woodpecker
Yellow-shafted Flicker
Water Thrush
Song Sparrow
American Goldfinch
Field Sparrow
House Wren
Cedar Waxwing
Slate-colored Junco
Tufted Titmouse
Black-capped Chickadee
Phoebe
Cliff Swallow
Chimney Swift
Baltimore Oriole
Catbird
Scarlet Tanager
Mourning Dove
Rufous-sided Towhee
Common Grackle
European Starling
American Bittern (SC)
Glossy Ibis
Great Blue Heron
Black-crowned Night Heron
Green-backed Heron
Double-crested Cormorant
European Cormorant
Common Loon (SC)

Mammals

Red Squirrel
Grey Squirrel
Northern Flying Squirrel
Raccoon
Woodchuck
Red Fox
Muskrat
Opossum
Eastern Cottontail Rabbit

19 FORT HILL STREET, HINGHAM, MASSACHUSETTS 02043
(617) 749-5387 OFFICE (617) 749-1248 MEDICAL CENTER

Mammals, cont'd.

Eastern Chipmunk
Short-tailed Shrew
White-footed Mouse
Little Brown Myotis
Big Brown Bat
Meadow Vole
Striped Skunk
Short tail Weasel

Reptiles and Amphibians

Northern Spring Peeper
Green Frog
Bullfrog
Wood Frog
Northern Leopard Frog
American Toad
Eastern Garter Snake
Black Rat Snake
Northern Water Snake
Spotted Salamander
Red-backed Salamander

(List compiled from sightings,1985-1989; Richard Horton, Victoria Smythe, New England Wildlife Center, Inc., 1989)

Status Codes (appear in parentheses next to species)

E - Endangered. Any reproductively viable native species which has been documented by biological research and inventory to be in danger of extirpation from the commonwealth.

T - Threatened. Any reproductively viable native species which has been documented by biological research and inventory to be rare or declining within the Commonwealth and which is likely to become endangered in the Commonwealth in the foreseeable future.

SC - Special Concern. Any reproductively viable native species which has been documented by biological research and inventory to be suffering a decline that could threaten the species in the Commonwealth if allowed to continue unchecked, or which occurs in such small numbers or with such a restricted distribution or specialized habitat requirements that it could easily become threatened.

(Status Codes from the Massachusetts Natural Heritage Program listing, February 1988. 321 CMR 8.00 lists the rules and regulations relative to the establishment of the Commonwealth's list of endangered and threatened species.)

APPENDIX IV - NATURAL HERITAGE ENDANGERED SPECIES PROGRAM, FACT SHEETS

Natural Heritage & Endangered Species Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Field Headquarters
Route 135
Westborough, MA 01581
(508) 792-7270, ext. 200

VERNAL POOLS

What Is a Vernal Pool?

Vernal pools are temporary bodies of freshwater that provide critical habitat for many vertebrate and invertebrate wildlife species. "Vernal" means spring, and indeed, most vernal pools are filled by spring rains and snowmelt, only to dry up during the hot, dry months of summer. Many vernal pools, though, are filled by the rains of autumn and may persist throughout the winter. Vernal pools are often very small and shallow; vernal pools which support rich communities of amphibians and invertebrates may measure only a few yards across. However, vernal pools of several acres are not rare throughout much of Massachusetts.

Where are Vernal Pools Found?

Vernal pools are common in Massachusetts, probably occurring in almost every town in the state. Vernal pools are found across the landscape, anywhere that small woodland depressions, swales or kettle holes collect spring runoff or intercept seasonally high groundwater tables. Although many people associate vernal pools only with wooded areas, ecologically significant vernal pools are also found in meadows, sand flats, river floodplains, and in large vegetated wetland complexes.

Why are Vernal Pools Valuable?

Vernal pools constitute a unique and increasingly vulnerable type of wetland that is inhabited by many species of wildlife, some of which are totally dependent on vernal pools for their survival. Since vernal pools are temporary bodies of water, they do not support fish populations. The Wood Frog (*Rana sylvatica*), the Eastern Spadefoot Toad (*Scaphiopus holbrookii*) and the four local species of mole salamander (*Ambystoma spp.*) have evolved breeding strategies intolerant of fish predation on their eggs and larvae; the lack of fish populations is essential to the breeding success of these species. Other amphibian species, including the American Toad (*Bufo americanus*), Green Frog (*Rana clamitans*) and the Red-spotted Newt (*Notophthalmus viridescens*), often exploit the fish-free waters of vernal pools but do not depend upon them. Vernal pools also support a rich and diverse invertebrate fauna. Some invertebrates species, such as fairy shrimp (*Eubranchipus spp.*) complete their entire live cycle in vernal pools. Invertebrates are both important predators and prey in vernal pool ecosystems. Vernal pools are an important habitat resource for many species of birds, mammals, reptiles and amphibians.

Are Vernal Pools a Threatened Resource?

Yes! Prior to 1987, vernal pools in Massachusetts were not given protection under the state's Wetlands Protection Act, and protection under the federal Clean Water Act was not always administered consistently or adequately. As a result, many vernal pools were filled as part of the rapid development that has occurred throughout the Commonwealth in the past several decades. Three species of mole salamanders, the Eastern Spadefoot Toad, and two crustaceans, all of which require vernal pools, are now considered rare in Massachusetts.

Vernal Pool Protection

The Massachusetts Wetlands Protection Act, Title V of the Massachusetts Environmental Code, the Massachusetts Surface Water Quality Standards, and the Forest Cutting Practices Act all provide certain regulatory protection for vernal pool habitat. Such protection is not automatic, however. The Wetlands Protection Act regulations protect vernal pools located only within Wetland Resource Areas. The regulations presume that vernal pools do not exist on a site unless they have been officially certified by the Natural Heritage & Endangered Species Program of the Division of Fisheries & Wildlife, or if scientific evidence is presented to the local conservation commission or DEP which clearly demonstrates that a Wetlands Resource Area functions as wildlife habitat. The regulations for Title V, the Massachusetts Surface Water Quality Standards, and the Forest Cutting Practices Act protect vernal pools, regardless of their size or location, if certified by the Division. Only vernal pools that meet certain biological and physical criteria established by the Natural Heritage & Endangered Species Program can be certified.

How Can Vernal Pools be Certified?

The Certification Program depends entirely on the initiative of interested individuals and organizations. Interested parties should:

1. Contact the Massachusetts Natural Heritage & Endangered Species Program to obtain the "Guidelines for the Certification of Vernal Pool Habitat," along with several Vernal Pool Field Observation Forms;

2. Locate potential vernal pools and complete the Field Observation Form;

3. Submit the Field Observation Forms, along with supporting physical and biological evidence and required mapping documentation to the NH&ESP for review (the preferred type of evidence needed for meeting the biological certification criteria is photographic documentation of breeding by Wood Frogs or mole salamanders, or the presence of fairy shrimp. See the "Guidelines" for details).

Following receipt of certification materials, the Natural Heritage & Endangered Species Program will consider the completeness and accuracy of the information and documentation presented. The observer, town conservation commission and the regional office of the Department of Environmental Protection will be notified of the certification of the vernal pool when complete. The locations of Certified Vernal Pools are plotted on maps supplied to town conservation commissions containing the "Estimated Habitats of Rare Wetlands Wildlife and Certified Vernal Pools" on a biennial basis. The Natural Heritage & Endangered Species Program also produces a state-wide Atlas of these maps available at cost.

To determine whether or not a vernal pool falls within a Wetlands Resource Area, contact the members of your local conservation commission. For general information regarding the Wetlands Protection Act, as well as the names and addresses of local conservation commissioners, call the Massachusetts Association of Conservation Commissions at (617) 489-3930. For specific information regarding the regulatory protection afforded certified vernal pools, as well as uncertified vernal pools, contact the Department of Environmental Protection.

January 1996

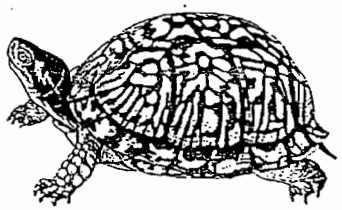
Natural Heritage & Endangered Species Program

Natural Heritage & Endangered
Species Program
MA Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581-3337

MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Eastern Box Turtle
(Terrapene carolina carolina)

DESCRIPTION: The Eastern Box Turtle is a small, terrestrial turtle ranging from 11.4–20.3 cm (4.5–8 in.) in length. It is so named because it is the only North American turtle that when threatened is able to enclose head, legs, and tail completely within the protective armor of its upper (carapace) and lower (plastron) shells. The adult box turtle has a short, broadly oval, high dome shell with variable markings and coloration. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish spots, blotches, or stripes in each carapace shield. The plastron may be tan to dark-brown or black, patternless or variably patterned light and dark—almost a mottled pattern of dark brown/black or tan/yellow; its surface either concentrically ridged or smooth; and divided into two movable portions by a strong hinge. The head, neck, and legs also vary in color and markings but are generally dark with orange or yellow mottling. The Eastern Box Turtle has four toes on its hind feet; a short tail; and an upper jaw ending in a down-turned beak.



DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England. Amherst, Massachusetts: The University of Massachusetts, 1983.

Although there are no striking sexual differences between the male and female Eastern Box Turtles, there are, however, external features that generally distinguish between the male and female. The male box turtle usually has bright-red to red-orange eyes, with those of the female being gray-brown, yellowish-brown or very dark-red. The rear lobe of the male plastron is concave, and that of the female is flat or slightly convex. The hind legs of the male are heavier and the claws stouter, shorter and more curved than the female. Males have longer, thicker tails, with the vent located farther from the shell and closer to the tip of the tail than the female. Both sexes are generally mild-mannered.

Range of the Eastern Box Turtle

Distribution in Massachusetts
Since 1978

Hatchlings have a flat, brownish-gray carapace with a yellow spot on each large scute; and yellow along the outer rim of the carapace, the mid-dorsal keel, and the lower mandible. The plastron is yellow to cream-colored with a black central blotch and yellow margining along the outside edge. The plastal hinge is not functional and poorly developed. The tail is long in comparison with that of the adult. Hatchlings, if molested, emit a strong odor to repel predators; an adaptation that is lost later on.

SPECIES SIMILAR IN MASSACHUSETTS: The Blanding's Turtle (Emydoidea blandingi) is the only species of turtle in Massachusetts that resembles the Eastern Box. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull its exposed part upwards towards its carapace but with less closure than in the Eastern Box Turtle. Outside of this specific adaptation, there is little or no similarity either in appearance or behavior between the two species. The Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial.

RANGE: The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although the Eastern Box Turtle occurs almost statewide in Massachusetts, the majority of the population occurs in the southeastern section of the Bay State, just west of Cape Cod.

HABITAT IN MASSACHUSETTS: The Eastern Box Turtle is a woodland species, although in the northeast it also occurs in pastures and marshy meadows. It is found in both dry and moist woodlands, brushy fields, thickets, marshes, bogs, stream banks, and well-drained bottomland. It prefers open deciduous forests but has also been found on mountain slopes in Massachusetts. In optimal habitats in Cape Cod pine barrens and oak thickets, the species is generally associated with cranberry dominated swales interspersed with bearberry ground cover, low bush blueberries, and thickets of bracken fern.

LIFECYCLE/BEHAVIOR: The Eastern Box Turtle usually hibernates in the northern parts *of* its range from late October or November until sometime in April. In the deep south, it may remain semiactive throughout the winter. Hibernation generally begins at the time of the first killing frost. As many as four box turtles may share the same winter quarters, which range in type from loose soil, sand, vegetable debris and mud bottoms of ponds or streams to animal burrows or stump holes. As soil temperatures drop, the turtles burrow into the soft ground for a depth of from three inches to two feet. Females tend to hibernate first, with the males lingering to ensure that all females have been fertilized. They normally emerge from hibernation in April, but some individuals may emerge prematurely during warm spells in winter and early spring and perish from exposure.

Mating may take place as soon as the turtles emerge from hibernation or at any time until they enter hibernation again. Courtship begins with the male circling the female and biting at her shell, head, and legs, before mounting. Females nest from May to July and can lay fertile eggs up to four years after a single mating. Nesting areas may be in hay fields, roadsides, cultivated gardens, lawns, beach dunes, and woodland, and around house foundations. The eggs are deposited in a flask-shaped nest dug by the female's hind feet in loose soil at an elevated site, usually in an open area in close proximity to the previous years' nest. Egg laying occurs during the late afternoon-early evening and continues for up to five hours. Three to eight (usually four or five) thin, white, elliptical eggs are deposited by the female at intervals of one to six minutes; arranged in the nest by the hind feet; and then covered with soil by the hind legs and plastron. After the eggs are covered, the female crawls away, leaving the eggs unattended to incubate. The incubation period depends on soil temperature but generally the hatchlings emerge about 87–89 days after laying, usually in September. They may overwinter in the natal nest and emerge the following spring.

During the first four or five years of life, box turtles may grow at a rate of from half an inch to about three-quarters of an inch a year. Sexual maturity is thought to occur later in New England than in its southern range and may take up to 10 years to attain. It is believed that full growth is reached in about 20 years. The average life expectancy of a box turtle is between 40 and 50 years, but evidence shows that they can live as long as 80 to 123 years.

The Eastern Box Turtle is omnivorous, showing marked changes in food preferences from youth to maturity and from season to season. When young, it is chiefly carnivorous, feeding on insect larvae, slugs, earthworms, snails, spiders, crayfish, millipedes, fish, frogs, salamanders, a small percentage of vegetable material, and even carrion. At

approximately six years of age, box turtles develop a fondness for fungi (primarily mushrooms), berries, fruits, leafy vegetables, roots, stems, leaves and seeds. The adults take animal food with less frequency than young turtles.

In summer, adult box turtles are most often encountered in open woodlands in morning or evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. Though known as "land turtles", in hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, box turtles forage at any daylight hour. They are diurnal, and scoop out a "form "(a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms are often used on more than one occasion over a period of weeks. Juvenile box turtles are rarely seen. Immediately after hatching they seek a swamp or pond and immerse themselves in sphagnum moss or mud, remaining well hidden.

The home ranges of box turtles of all ages and both sexes overlap. The turtles frequently occur together and show no antagonism over territorial domain. Movements within the home range vary from random meanderings to fairly direct traverses. Occasional trips outside the range are made by some individuals; these trips include searches for nesting sites. Most adults show some homing tendency over short distances, such as a kilometer or two, but long distances as a result of human interference usually kills them. They orient themselves by the sun and rely on their vision for guidance and mobility. They have very defined home ranges averaging about 100 to 225 meters (100 to 750 ft.) in diameter. Some individual are transient and do not establish home ranges.

POPULATION STATUS: The Eastern Box Turtle has been declining in numbers throughout its range in Massachusetts and is presently listed as a "Species of Special Concern" in this state. Since 1978, only 187 sightings have been reported to the Natural Heritage and Endangered Species Program, with heaviest concentrations in the southeastern part of the state and Cape Cod. Many of the sightings are road crossings or single individuals making it difficult to estimate the size of the population. There are several reasons for this decline: habitat destruction resulting from residential and industrial development and concurrent dissection of the landscape with roads; deliberate and inadvertent highway mortality; collection by individuals for pets; destruction of nests and young by skunks, coyotes, foxes, crows, dogs, and raccoons; and genetic degradation of the native stock by imported captives that escape or are released.

MANAGEMENT RECOMMENDATION: The greatest threat to the survival of the Eastern Box Turtle in Massachusetts is the fragmentation and destruction of its habitat. The bisection of its habitat by roads can reduce or destroy populations. Due to the decline of farming in Massachusetts, agricultural land is being returned to woodland. A mixture of regeneration, selective cutting and even selective burning of woodland may be beneficial to the Eastern Box Turtle. Large roadless areas of optimal habitat need to be preserved, especially in the Box Turtle's stronghold of Cape Cod. Though a law exists to protect against the importation, transportation, and release of wild animals in Massachusetts, this law, and the biological reasoning behind it, need exposure and publicity in the community at large, as well as enforcement. To ensure the long term survival of the Eastern Box Turtle, protection of its habitat is needed, as is education of the public about the detrimental affects of removing turtles from their natural habitats and keeping them as pets. Enforcement of the Massachusetts Endangered Species Act prohibiting the killing, molestation, and possession of the Eastern Box Turtle must also be improved. People should be encouraged to help box turtles across roads (always in the direction the animal is heading), and should be made aware that box turtles should never be transported or captured as pets. Finally, the practice of releasing non-native box turtles must be discouraged to protect the genetic integrity of native populations.

1994

Partially funded by a grant from DEM Forest Stewardship Program

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EASTERN BOX TURTLE
(Terrapene carolina carolina)

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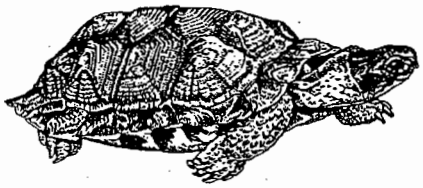
Natural Heritage & Endangered Species Program

Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581-3337

MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Wood Turtle
(Clemmys insculpta)

DESCRIPTION: The Wood Turtle is one of the most terrestrial of North American turtles. It is a medium sized turtle and the largest member of its genus, ranging from 12–23 cm (5–9 in) in length. The Wood Turtle is so named because the roundish segments of its upper shell (carapace) resemble a wood-grained cross-section of a branch complete with growth rings. The carapace is characteristically rough and is sculptured with grooves and ridges that rise upward to form individual pyramids. The raised pyramid-like shields, prominent central keel, and slight upward flare of the pointed posterior marginals give this turtle its unique shape. It is this sculptured appearance that has earned the Wood Turtle its species name insulpta.

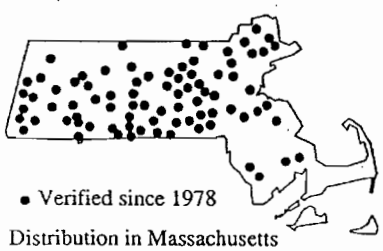


DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England, Amherst, Massachusetts: The University of Massachusetts, 1983.

The carapace is brown, often with yellow streaks radiating from protruding black flecked centers. The undershell (plastron) is bone yellow with an irregular black blotch on the outside posterior corner of each scute (plate-like scale). The head, top of the neck and tail, and the outer scales of the legs and the claws are black. The undersides of the neck and legs are orange or red thus giving rise to the vernacular name "redlegs"; used during the early part of the 20th century when these turtles were sold as food. The legs are clad with thick protective scutes, particularly on the male. The sides of the head are arched downward, and this trapezoid shape, along with moist dark eyes, gives the Wood Turtle a sad look.

Males can be distinguished from females by their longer, thicker tail, a concave plastron with a deeply notched rear margin, and prominent scales on the front of the forelegs. Males are generally larger than females. Young are a gray brown with no red or orange color, the shell is keelless, and the tail as long as the carapace.

Range of the Wood Turtle



Distribution in Massachusetts

SIMILAR SPECIES IN MASSACHUSETTS: The habitat of the Eastern Box Turtle (Terrapene carolina) and the Blanding's Turtle (Emydoidea blandingi) may overlap that of the Wood Turtle, but neither has the Wood Turtle's pyramidal shell segments. Unlike the Wood Turtle, the Box and Blanding's Turtle have hinged plastrons into which they can withdraw or partially withdraw if threatened. The Northern Diamondback Terrapin (Malaclemmys terrapin) has a shell similar to that of the Wood Turtle, but its skin is grey and it lives only near saltwater (which the Wood Turtle avoids).

RANGE: The Wood Turtle can be found throughout New England, north to Nova Scotia, west to eastern Minnesota, and south to northern Virginia.

HABITAT IN MASSACHUSETTS: The preferred habitat of the Wood Turtle is riparian areas. Slower moving streams are favored, with sandy bottoms and heavily vegetated stream banks. The bottoms and muddy banks provide hibernating sites for overwintering, and sandy or gravelly banks are used for nesting. The Wood Turtle spends most of the spring and summer in meadows and upland forests and returns to the streams in late summer or early fall to mate and overwinter. During the day, it is often seen in woodlands, hayfields, and along roadsides adjacent to streams.

LIFECYCLE/BEHAVIOR: The Wood Turtle has a way of life that makes it at home either in or out of the water. Next to the box turtle, it our most terrestrial species; possessing exceptional intelligence and a unique climbing ability. In southern or coastal areas of its range, the Wood Turtle becomes active in late March, but elsewhere it is usually mid-to late April or even May before it is sighted. Upon coming out of hibernation, the Wood Turtle begins its terrestrial activity by moving up on the river bank to bask in the sun. This species is diurnal (active by day), foraging in midday and sunning on logs in streams or along muddy river banks in the early morning and late afternoon. It is this habit of basking on the muddy river banks which has given the Wood Turtle the popular name "mud turtle." The Wood Turtle leads a rather solitary life and rarely will one find more than a single wood turtle at a time.

Wood Turtles remain relatively close to their streams and rivers, rarely getting more than a few hundred meters away from the banks. They have relatively linear home ranges that tend to run up to 1.6 km (a mile) in length. Males have been observed exhibiting aggressive behavior such as chasing, biting, and butting both during the mating season and at other times. This behavior appears to be more about social status than territorial ownership. Typically, one or both males make an "open mouth" gesture, snapping open and closing the mouth near the other's head, rarely resulting in actual biting. Prolonged interactions are often accompanied by audible hissing from one or both animals. Females tend to be more peaceable; interactions seldom involve more than a simple nose touching and departure.

The Wood Turtle becomes sexually active in the spring when the water temperature reaches 15 C (59 F). This species has a courtship ritual involving a "dance" that takes place for several hours prior to mating. The dance involves the male and female approaching each other slowly with necks extended and their heads up. Before they actually touch noses, they lower their heads and swing them from side to side. Courting adults may produce a very subdued whistle that is rarely heard by observers. These courtship behaviors occur on land, yet actual mating appears to take place only in the water.

The female Wood Turtle wanders in search of a nest site in late May or mid-June. She often digs her nest during or just after a slight rainstorm. Nest-digging can begin relatively early in the morning or late in the afternoon. The female Wood Turtle generally digs several six-inch holes before deciding on a definite nest site. The function of this may be to confuse nest predators that are searching for buried eggs. The female digs her nest using her hind feet only. The nest is a six-inch hole dug in sandy or soft loam sand areas, including gravel banks, roadsides, fields and meadows. It is generally high enough out of the river's floodplain to avoid inundation by fluctuating water levels. A clutch of 4 to 12 (generally 7 to 9) eggs are deposited inside the nest, covered with sand, and left to incubate for ten to sixteen weeks in the warmth of the sun. The eggs are white, smooth, and elliptical measuring 3.4 cm (1.4 in) in length and 2.4 cm (0.95 in) in width. From beginning to end, the nesting process may take three or four hours. Wood turtles lay only one clutch per year.

Hatchlings may leave the nest immediately or may remain in the nest over the winter and emerge in early spring. The young turtles are miniatures of the adults but have long tails. Once out of the nest, the young seek out the deep portions of streams where they virtually disappear until they become sexually mature at the age of twelve to fifteen years. The life span of the adult Wood Turtle is easily 50 years and may frequently reach 80 years of age.

The Wood Turtle is omnivorous and an unusual member of its family in that it exploits both aquatic and terrestrial food sources. Its diet consists of plant material from algae and grasses to berries and animal matter including insects, fish, earthworms, tadpoles, and carrion from many kinds of animals. The Wood Turtle often exhibits an unusual feeding behavior referred to as "stomping." In its search for food, this species will stomp on the ground alternating its front feet, creating vibrations in the ground resembling rainfall. Earthworms, responding as though to rainfall, rise to the ground's surface to keep from drowning. Instead of rain, the earthworm is met by the Wood Turtle, and is promptly devoured.

In October, the Wood Turtle returns to the deep channels of streams for the winter. With head and limbs tucked in under the carapace and tail extended, it lies next to submerged anchored stumps and logs on the sides of the stream away from the main current. It also may hibernate in large groups in community burrows which may include muddy banks, stream bottoms, deep pools, decaying forest vegetation, and abandoned muskrat burrows.

POPULATION STATUS IN MASSACHUSETTS: The Wood Turtle is listed as a "Species of Special Concern" in Massachusetts. Since 1978, there have only been 153 sightings reported to the Massachusetts Natural Heritage and Endangered Species Program in 97 different locations across the state. It should be noted that these sightings are not indicative of populations but may be road crossing sightings or single individuals. Population decline of this species has been caused by pollution of streams, development of wooded streambanks, the unnatural increase in predation due to human presence, highway casualties, and extensive commercial and incidental collection of specimens for pets. Wood turtles are also killed during hay-mowing operations.

MANAGEMENT RECOMMENDATIONS: In order to ensure the longevity of the Wood Turtle as a species, the following recommendations regarding specific habitat preservation are suggested. In reference to timber harvesting, the primary concerns are the preservation of the local environments near streams and the prevention of siltation. Establishment of a minimum 50-foot no-cut buffer zone along the streams and rivers; the implementation of erosion controls that may be appropriate for the specific site (particularly recommended in steep slope situations); and utilization of portable or temporary bridges rather than fording to cross streams are strongly suggested. Selective rather than regeneration cutting within 50-300 feet of streams known to be inhabited by Wood Turtles may also help to maintain suitable habitat for this species. Wood Turtles often use clearings and meadows and would probably benefit from slash piles. Avoid use of heavy equipment within 50 feet of streams and minimize use 50-100 feet from streams.

Enforcement of the Massachusetts Endangered Species Act is also needed to protect this species from the pet trades and biological supply. In a five-year study in Pennsylvania by John H. Kaufmann, research showed that though this species is long lived, population data may be misleading as the individuals sighted were older turtles, and not reproducing at a sustainable population rate. It is estimated that there may be as much as a 99% mortality rate from hatching to adulthood (Robakiewicz). In small populations such as those in Massachusetts, such a high mortality rate could prove disastrous.

In summary, the Wood Turtle populations and their habitats need protection This species is attracted to tangles of vegetation, though the specific type of plant matter appears to be unimportant. Not mowing within 100 meters (100 yds) of stream banks encourages woody vegetation such as gray dogwood to flourish. In upland sites, fallen trees should be left. Meadows dense with many layers of vegetation are preferred by Wood Turtles over well-mown lawns. Encourage brushy tangles and get local gardeners to allow a few tomatoes and strawberries to run rampant so that turtles can harvest some of the fruit. Protecting riverine corridors is important to prevent fragmentation of habitats and populations. In addition, protecting wetlands and water quality is critical as these turtles show a tendency to return to the same stream each year, and they are sensitive to pollution (Robakiewicz).

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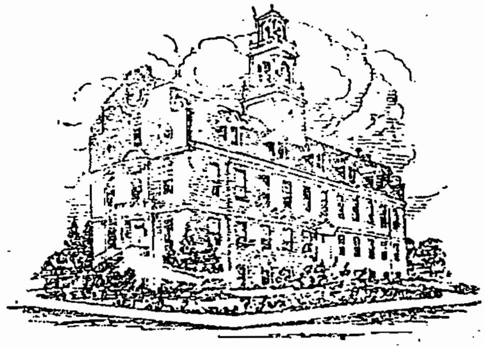
Partially funded by a grant from DEM Forest Stewardship Program

APPENDIX V - HERRING RUN RULES AND REGULATIONS
TOWN OF WEYMOUTH 1982

ARD OF SELECTMEN

JAMES V. CIERI
Chairman
RICHARD O. WALSH
Vice Chairman and Clerk
BARBARA LEARY
PEG ...
RICHARD E. ...

335-2000



75 Middle Street
East Weymouth, Mass. 02189

TOWN ADMINISTRATOR

APRIL 26, 1982

THE TOWN OF WEYMOUTH

P U B L I C   N O T I C E

MANAGEMENT PLAN

RULES & REGULATIONS FOR WEYMOUTH HERRING RUN

The Board of Selectmen, under the authority granted by Chapter 130, Sec. 94 and 95 of the General Laws of Massachusetts, unanimously voted on April 26, 1982 to adopt the following rules and regulations for the taking of herring and alewives with the Town of Weymouth:

1. Administration will be under control of the Board of Selectmen.
2. The Weymouth Herring Warden and/or Police will be responsible for enforcement.
3. The catch allowance, if stock allows, will be 12 per day for Residents or per catch, if less; for Non-Residents, the number will be 12 per day or per catch, if less, with ½ bushel per season maximum.
4. A Permit will be required - $2.00 for Residents; $4.00 for Non-Resider the fee to be reviewed annually by the Selectmen.
5. Initially no commercial fishing will be allowed. In the future, a decision will be made prior to the Run, based on the strength of the previous three year runs. The Conservation Commission, through the Herring Run Committee, with technical assistance from the Department of Marine Fisheries, will assess the viability of the comming Run and make a decision. Should a decision be made to allow commercial fishi the Herring Run Committee will set specific days, catch limits, the number of licenses to be issued, and an appropriate fee schedule.
6. The Season will run from April 7 to June 15 - from sunrise to sunset. Tuesday, Thursday, and Saturday will be set aside for the taking of fish, if permits are given. From June 15 to April 7th, it will be "Closed Season".
7. Alewives will be caught by dipnet only.
8. The Catch area will be by the Jackson Square Pool only.
9. Punishment for violations are provided in the Mass. General Laws, Chapter 130, Section 2:

APPENDIX VI - SHELLFISH MANAGEMENT PLANS FOR CONTAMINATED SHELLFISH : WEYMOUTH AND HINGHAM

TOWN OF WEYMOUTH

SHELLFISH MANAGEMENT PLAN FOR CONTAMINATED SHELLFISH

1. PURPOSE: The following plan is intended for use by the Town of Weymouth as a conservation and law enforcement cooperative measure to insure adequate control of contaminated shellfish harvested within the Town of Weymouth, under authority of Massachusetts General Laws Chapter 130, section 52 and 75. For the purposes of this management plan. Shellfish shall mean, soft shell clams of the species, Mya arenaria.

2. DEBARKATION-LANDING SITES: When any clamming area is opened within the corporate bounds of the Town of Weymouth the debarkation and landing site shall be designated by the Massachusetts Division of Marine Fisheries. Any change of a debarkation or landing site will be with prior approval of the Weymouth Shellfish Warden. The Shellfish shall immediately notify the Massachusetts Division of Environmental Law Enforcement on changes in debarkation and landing sites.

3. RACK LIMITS: A daily rack limit may be imposed upon each digger when the Division of Marine Fisheries and the Town of Weymouth agree such measure is necessary. Any rack limit shall be based upon the capacity of the Massachusetts Division of Marine Fisheries Shellfish Purification Plant to adequately depurate contaminated shellfish, or upon resource conservation considerations. No Master Digger and no Subordinate Digger shall exceed a rack limit.

4. RACK TRACEABILITY & FEES: The Weymouth Shellfish Warden shall maintain a daily record of the number of racks dug on each day for every Master Digger. Such records shall contain the following information:
   a. The date and designation of the area being harvested.
   b. The name and permit number of the Master Digger present and any designated agents.
   c. The number of racks collected by each Master Digger.
   d. The names and permit numbers of Subordinate Diggers present, along with the daily catch record by area of each subordinate may also be recorded at the discretion of the Shellfish Warden.

   Each Master Digger shall be assessed a rack fee of one dollar ($1.00) for each and every rack they collect.

5. LICENSES: Each Master Digger and Subordinate Digger shall procure a Shellfish License from the Shellfish Warden prior to harvesting any shellfish. Any person who is a resident of the Town of Weymouth shall be eligible for a Resident Shellfish License upon payment of a fee of one hundred dollars ($100.00). Any person who is a resident of the Commonwealth of Massachusetts shall be eligible for a Non-Resident Shellfish License upon payment of a fee on one hundred and fifty dollars ($150.00). Weymouth shellfish licenses shall be valid for one year between July 1st of any year to June 30th of the subsequent year, inclusive. Applicants for a Weymouth Shellfish License shall possess a valid state permit.

6. REVENUES: All revenues collected from rack fees and shellfish licenses shall be deposited in the Town of Weymouth Waterways Fund to be utilized to implement this management plan and to take whatever measures necessary to preserve the town's shellfish resources or other related waterways improvements.

7. CLOSED AREAS: The Town of Weymouth may from time to time survey shellfish harvest areas to determine the extent of the resource and the ratio of legal size clams (i.e.2.0 inches or grater) versus sublegal clams (i.e. 2.0 inches). The Division of Marine Fisheries shall assist in survey planning and upon receipt of survey data, shall assist in data analysis. Survey information shall be used to recommend to the Weymouth Board of Selectmen whether an area should close to shellfishing for the purposes of propagating and protecting the resource. Based upon recommendations of the Division of Marine Fisheries, the Board of Selectmen may at their discretion, and pending approval by the Director of the Division of Marine Fisheries, institute a closed season for an area in accordance with the provisions of Massachusetts Laws, Chapter 130, section 52. The Massachusetts Division of Marine Fisheries reserves the right o institute public heath closures under provisions of Massachusetts General Laws Chapter 130, section 74 and 74A. Such closures shall take effect immediately.

8. BEACH AREA: The Weymouth bathing beach, so defined as that area situated between Fort Point Road and the Jetty at the Wessagusset Yacht Club, shall be designated a Beach area. No shellfishing shall be permitted on a designated Beach area between May 1st and September 30th of any year. All holes dug on a Beach Area in the attempt to harvest Shallfish shall be filled by the shallfisherman before digging any subsequent holes and leaving the Beach area.

   Additional Beach Areas may be designated upon agreement between the Weymouth Shellfish Warden and the Division of Marine Fisheries.

9. TRANSPORTATION: Shellfish from restricted areas open to harvesting shall be transported to the Division of Marine Fisheries Shellfish Purification Plant via routes designated by the Division of Marine Fisheries. Any route changes may be made by authority of the Shellfish Warden providing the Massachusetts Division of Environmental law Enforcement is notified of such changes before hand.

10. HARVESTING SCHEDULE: No more than one area per day may be harvested. It is the prerogative of the Shellfish Warden to assign diggers to a harvesting area not closed to shellfishing by the Division of Marine Fisheries or the Town of Weymouth. It shall be incumbent upon the Shellfish Warden to notify the Division of Marine of Marine Fisheries and the Division of Environmental law of the area presently being harvested. The Town of Weymouth, it's Shellfish Warden and shellfishermen who participate in this plan agree to adhere to the schedule of the Shellfish Purification Plant and make changes necessary relative thereto.

11. HOLD OVER: All shellfish harvested on any day shall be transported that day to the Shellfish Purification Plant except that a hold over may only be grant for emergencies. In case of emergencies, hold over will be allowed upon agreement between the Weymouth Shellfish Warden and the Division of Marine Fisheries and notification of the Division of Environmental Law Enforcement.

12. REPORTING: The Shellfish Warden shall make a written annual report to the Division of Marine Fisheries including, but no necessarily limited to, the annual shell fish catch by area and by Master Digger.

13. ENFORCEMENT: The Shellfish Warden and any other town official the Board of Selectmen may designate as an enforcing person as well as Environmental Police Officers of the Massachusetts Division of Environmental Law Enforcement shall have authority to enforce provisions of this management plan.

14. PENALTIES: Whoever violates any provision made under the authority of this management plan shall be subject to penalties established by the Town of Weymouth and in accordance with Chapter 130 of the Massachusetts General Laws.

15. DURATION: This plan shall remain in effect for three (3) years and may be renewed.

16. CHANGES & REVIEW: This plan shall be reviewed annually by the Division of Marine Fisheries and the Shellfish Warden. Changes may be made at anytime upon written request and mutual concurrence of the Weymouth Board of Selectmen and the Division of Marine Fisheries.

17. SEVERABILITY: The Weymouth Board of Selectmen or Division of Marine Fisheries may revoke this plan upon thirty (30) day written notice made by registered mail.

APPROVED:

DIVISION OF MARINE FISHERIES

_____ Director

WEYMOUTH BOARD OF SELECTMAN

_____
PEG GOUDY CHAIRMAN

_____
WILLIAM B. BARRY, JR.

_____
GREGORY P. HARGADON

_____
DONALD G. HUNT

_____
JOSEPH R. PIPER

TOWN OF HINGHAM

Shellfish Management Plan

1. Purpose: The following plan is intended for the use of the Town of Hingham as a conservation and law enforcement cooperative measure to insure adequate control of moderately contaminated shellfish harvesting within the Town of Hingham.

2. Debarkation- Landing Site: When any clamming area is open within the limits of the Town of Hingham, the debarkation and landing point will be specified by the Shellfish Constable prior to the start of each week as will area to be open.

3. Racks: Each Master Digger will provide a maximum of five (5) standard racks to each digger per day for transportation and depuration from the management area. No digger will be allowed to harvest more than five (5) half-bushels per day.

4. Master Digger: Each Master Digger will be assessed a fee of one dollar ($1.00) per rack for himself and subordinate diggers. The rack fee applies to Resident and Non-resident diggers. Each Master digger will check with the Shellfish Constable or his Deputy daily before he or his subordinate diggers may go to the flats. Each Master digger will check out with the Shellfish Constable or his Deputy and fill out a daily report that will contain: a) the number of subordinates working that day. b) the number of racks dug. c) the specific area the shellfish were dug. If a Master Digger is late in reporting to debarkation point, he must locate the Shellfish Constable or his Deputy before he or his subordinates start digging. Failure to comply with these provisions shall be punishable by the revocation of Town Shellfish Permit and exclusion from participation in this management plan.

5. License: Each Master Digger and subordinate digger must procure a license from the proper authority in the Town of Hingham. Any person who is a resident of the Town of Hingham shall be eligible for a Resident Shellfish Permit upon payment of a fee of seventy five dollars ($75.00). /00.00 Any person who is a Resident of Massachusetts shall be eligible for a Non-resident Shellfish Permit upon payment of a fee of one hundred twenty five dollars (125.00). /50.00 Town permits commence ~~April 1st~~ July 1st, exp. June 31st. Each digger must have a state permit.

12. Shellfish Constable: The Shellfish Constables or Deputies will be present at the debarkation-landing site and within the boundaries of the mildly contaminated areas being harvested under this program for the portion of the day that the flats are open. The Shellfish Constables or Deputies shall be responsible for recording the following information:

a) The date and area being dug.
b) The names and number of the Master Diggers.
c) The names of subordinate diggers and number.
d) The total number of diggers in each crew.
e) The total number of racks taken.

The Shellfish Constable will write a daily report and send a report to the Depuration Plant and the Division of Marine Fisheries weekly.

13. Areas: BH-9E
BH-9A
BH-11
BH-12
BH-15
BH-20

14. Enforcement: The Town of Hingham, its Shellfish Constables and Deputies, and its Police Officers and the officers of the Massachusetts Division of Law Enforcement shall have full authority to enforce thes regulations. The Selectmen reserve the right to suspend or revoke any Shellfish license for any violation to this plan.

15) The person applying for inclusion in this plan must sign a copy of this Management Plan in the presence of the proper authority of the Town of Hingham.

Effective January 1st, 1988

Edward M. Lewiecki

Kate Mahony

John R. Brady

HINGHAM BOARD OF SELECTMEN

September 29th, 1987

APPENDIX VIII - 301 CMR 12.00 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

301 CMR 12.00 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Section

12.01: Authority

301 CMR 12.00 is promulgated by the Secretary of the Executive Office of Environmental Affairs pursuant to M.G.L. c. 21A, s. 2(7), which charges the Secretary and the EOEA agencies with developing policies regarding the acquisition, protection, and use of "areas of critical environmental concern to the Commonwealth", and St. 1974, c. 40(e), which directs the Secretary to designate such areas.

12.02: Purpose

301 CMR 12.00 establishes procedures by which Areas of Critical Environmental Concern (ACECs) may be designated, provides for dissemination of information on areas so designated, and establishes general policies for Commonwealth actions within designated ACECs.

12.03: General Provisions

ACECs are those areas within the Commonwealth where unique clusters of natural and human resource values exist and which are worthy of a high level of concern and protection. The designation process comprises five steps: nomination, review by the Secretary, public hearings, decision by the Secretary, and publication of notice of the results in the Environmental Monitor. The purpose of the designation process is to determine if the nominated area is of regional, state, or national importance or contains significant ecological systems with critical interrelationships among a number of components. After designation, the aim is to preserve and restore these areas and all EOEA agencies are directed to take actions with this in mind.

12.04: Definitions and Abbreviations

As used in these regulations, the following terms shall have the following meanings:

Action: a project undertaken directly by an agency, the granting of a permit by an agency, or the granting of financial assistance by an agency.

Area of Critical Environmental Concern: an area designated by the Secretary pursuant to these regulations (301 CMR 12.00).

Agency: any board, body, commission, corps, council, department, division, office, or administrative unit of the Commonwealth, however labeled, and any authority of any political subdivision which is specifically created as an authority under special or general law. In cases of doubt as to whether a body

12.04: continued

is an "agency" for purposes of these regulations, an opinion of the Secretary should be sought under M.G.L. c. 30A, s. 8.

Environmental Monitor: semi-monthly publication of actions and projects published by the Secretary pursuant to M.G.L. c. 30, ss. 62-62H and 301 CMR 11.19.

EOEA Agency: any agency, as defined above, created by, falling under, or falling within the Executive Office of Environmental Affairs.

Executive Office of Environmental Affairs: the agency created by M.G.L. c. 21A.

Financial Assistance: any direct or indirect financial aid provided by any agency, which shall include but not be limited to mortgage assistance, special taxing arrangements, grants, loans, loan guarantees, debt or equity assistance, and the allocation of state or federal funds.

Permit: a permit determination, order, or other action, including the issuance of a lease, deed, license, permit, certificate, variance, approval, or other entitlement to use, granted to any person, firm, or corporation, including trusts, voluntary associations, or other forms of business organization by an agency for or by reason of a project. "Permit" does not include a general entitlement to a person to carry on a trade or profession or to operate mechanical equipment which does not depend upon the location of such trade, profession, or operation.

Project: work, activity, or use directly undertaken by an agency or, if undertaken by a person, which seeks financial assistance from an agency or requires a permit by an agency. "Project" does not include a grant in aid for medical services or personal support, such as welfare or unemployment funds, to an individual or a third party on behalf of an individual.

Secretary: the Secretary of the Executive Office of Environmental Affairs.

(2) Abbreviations: The following abbreviations for agency names and other terms are used in these regulations:

ACEC Area of Critical Environmental Concern
EOEA Executive Office of Environmental Affairs
USGS United States Geological Survey

12.05: Nomination for Designation

(1) Areas may be nominated for designation as ACECs by:
(a) any 10 citizens of the Commonwealth;
(b) the Board of Selectmen, City Council, Mayor, Planning Board, or Conservation Commission of any city or town which would be affected by the designation;
(c) any state agency or regional planning agency;
(d) the Governor or any member of the General Court.

(2) Nominations shall be made by letter to the Secretary and must be accompanied by summary information regarding the resources of the proposed area, a suggested boundary for the area, and a general description of the benefits that would be achieved by designation. The nominated areas shall be delineated on the applicable map of the USGS 7 1/2 minute series or equivalent. If the features of the area are not clearly shown on such a map, additional maps, diagrams, or sketches at a larger scale must be included.

12.06: Eligible Areas

To be eligible for nomination, an area shall contain features from four or more of the following groups:

12.06: continued

(1) Fishery Habitat - anadromous/catadromous fish runs, fish spawning areas, fish nursery areas, or shellfish beds.

(2) Coastal Features - barrier beach system, beach, rocky intertidal shore, or dune.

(3) Estuarine Wetlands - embayment, estuary, salt pond, salt marsh, or beach.

(4) Inland Wetlands - freshwater wetlands, marsh, flat, wet meadow, or swamp.

(5) Inland Surface Waters - lake, pond, river, stream, creek, or ox bow.

(6) Water Supply Areas - surface water reservoir, reservoir watershed, groundwater aquifer, or aquifer recharge area.

(7) Natural Hazard Areas - floodplain, erosion area, or unstable geologic area.

(8) Agricultural Area - land of agricultural productivity, forestry land, or aquaculture site.

(9) Historical/Archaeological Resources - buildings, site, or district of historical, archaeological, or paleontological significance.

(10) Habitat Resources - habitat for threatened or endangered plant or animal species, habitat for species of special concern, or other significant wildlife habitat.

(11) Special Use Areas - undeveloped or natural areas, public recreational areas, or significant scenic site.

12.07: Review of Nominations

Upon receipt of the nomination the Secretary shall make an initial review of the proposed area and the reasons for its nomination. The Secretary may request such additional information from the nominating party as he deems necessary. The Secretary shall, within 45 days of receiving the nomination or such additional information as he may request under this section, whichever is later, inform the nominating party in writing either that he is accepting the nomination for designation and will proceed with a full review, or that he is declining to review the area for designation. If he declines, a summary of reasons shall be given.

12.08: Public Notice and Public Hearing

Before designating an area, the Secretary shall hold a public hearing. The hearing must be held within 25 miles of the area nominated or at the nearest location where a suitable facility exists. Public notice of the hearing shall be published by the Secretary not less than 30 days before such hearing in the Environmental Monitor. Notice shall also be published in a newspaper of general circulation in the vicinity of the nominated area and in appropriate trade, industry, informational, or professional publications. Such notice shall be mailed to the appropriate Boards of Selectmen, Town Managers, City Councils, or Mayors; Planning Boards; Conservation Commission; and at the Secretary's discretion, to interested citizens or organizations. Such notice shall include a citation of the authority under which the designation would occur, a summary of the reasons proposed for such a designation, the time and place of the hearing, and the method by which members of the public may make their views known. A map of the area to be designated may be included.

12.09: Criteria for Designation

The Secretary shall consider the following factors in making the finding required by 301 CMR 12.10. These factors need not be weighed equally, nor

12.09: continued

must all these factors be present for an area to be designated. While the more factors an area contains the more likely its designation, the strong presence of even a single factor may be sufficient for designation:

(1) Threat to the Public Health through Inappropriate Use: Future development of the area may threaten the public health, safety, or welfare because of the potential for pollution of the water supply, pollutants introduced indirectly through the food chain, landform alterations which adversely affect land stability or natural protection, existing natural hazards, or other direct or indirect effects which vary with the potential uses;

(2) Quality of the Natural Characteristics: The area possesses outstanding natural characteristics such as: high or unaltered land and water quality; undeveloped or unaltered land and water; outstanding trees or other vegetation; recreational opportunities;

(3) Productivity: The area is rich in nutrients serving as a food source for or hosting a high diversity of finfish, shellfish, waterfowl, wildlife, or other biota;

(4) Uniqueness of Area: The area is unique or unusual from a regional, state, or national perspective. Uniqueness will apply to endangered plant and animal species; geologic features; archaeological/historic/cultural features; or other resources of educational value;

(5) Irreversibility of Impact: The area has resources or characteristics which are potentially exhaustible or so fragile that alterations may have irreversible consequences. Irreversibility of impact will be assessed based on such factors as: the dependence of natural systems on groundwater; the tolerance of animals and habitats to pollutants; the degree of interdependence of ecosystems; and the sensitivity of species to changes in salinity;

(6) Imminence of Threat to the Resource: The area is subject to imminent threat such as: current proposals for major private development projects; plans for major new public infrastructure developments such as sewers, water systems, roads; or regional growth trends;

(7) Magnitude of Impact: The potential adverse impacts from changes to the area would be highly significant;

(8) Economic Benefits: The area has intrinsic values which are important to a region's economic stability. Such values include: recreation, tourism, fisheries development, and water supply;

(9) Supporting Factors: The area has other factors which favor preservation or restoration. Such factors may include: strong public consensus on the intrinsic value of the area; legislative identification of the value of the resource; public awareness of the importance of the area; the lack of coordinated local control because the area is contained within more than one municipality; ownership of some or all of the resource by the local, state, or federal government; or the existence of supplementing management programs in the area.

12.10: Secretarial Finding

The Secretary shall make a final decision as to whether or not to designate a nominated area within 60 days of the public hearing held pursuant to 301 CMR 12.08. The Secretary shall designate an ACEC only after finding that, on the basis of the information presented by the nominating party and at the public hearing and after a review of the factors listed in 301 CMR 12.09(1)-(9), the area is of critical environmental concern to the Commonwealth.

12.11: Notice and Effective Date of Designation

(1) The Secretary shall publish notice of the decision under 301 CMR 12.10 in the Environmental Monitor. The written findings shall be available for public inspection at the office of the Secretary. The effective date of any designation shall be the date of publication of the notice in the Environmental Monitor unless the Secretary shall otherwise provide.

(2) A designation shall not apply to any project if, at the time the Secretary receives a nomination:

(a) all necessary permits have been applied for; or
(b) an agency has commenced construction of a project.

12.12: Effects of Designation

Designation of an area as an ACEC shall have the following effects:

(1) All EOEA agencies shall take action, administer programs, and revise regulations in order to:

(a) acquire useful scientific data on the ACEC,
(b) preserve, restore, or enhance the resources of the ACEC, and
(c) ensure that activities in or impacting on the area are carried out so as to minimize adverse effects on:
1. marine and aquatic productivity,
2. surface and groundwater quality,
3. habitat values,
4. storm damage prevention or flood control,
5. historic and archeological resources,
6. scenic and recreational resources, and
7. other natural resource values of the area.

(2) All EOEA agencies shall subject the projects of federal, state, and local agencies and private parties to the closest scrutiny to assure that the above standards are met for any action subject to their jurisdiction.

12.13: Review of Designation

(1) The Secretary shall review periodically the designations of ACECs to evaluate the success of agency actions in the designated areas and whether the designation should be amended or repealed.

(2) At any time after an ACEC has been designated for one year, the Secretary or any of the nominating parties listed in 301 CMR 12.05 may seek to amend or repeal the designation. Such a petition shall be treated as a nomination under 301 CMR 12.07 through 12.11.

(3) At any time after one year from the time the Secretary has declined to designate an area, any person eligible under 301 CMR 12.05 may petition the Secretary to reevaluate that decision. Such requests shall be treated as a nomination.

(4) Any designation made under predecessor ACEC regulations shall stand, unless amended or repealed in accordance with 301 CMR 12.13.

12.14: Description and Maps of ACECs

Descriptions and maps of all designated Areas of Critical Environmental Concern shall be available from the office of the Secretary.

12.15: Waiver

The Secretary may waive any provision or requirement in these regulations not specifically required by law when in the Secretary's judgment strict compliance with such provision or requirement would result in an undue hardship and would not serve to further the intent of M.G.L. c. 21A, s. 2(7).

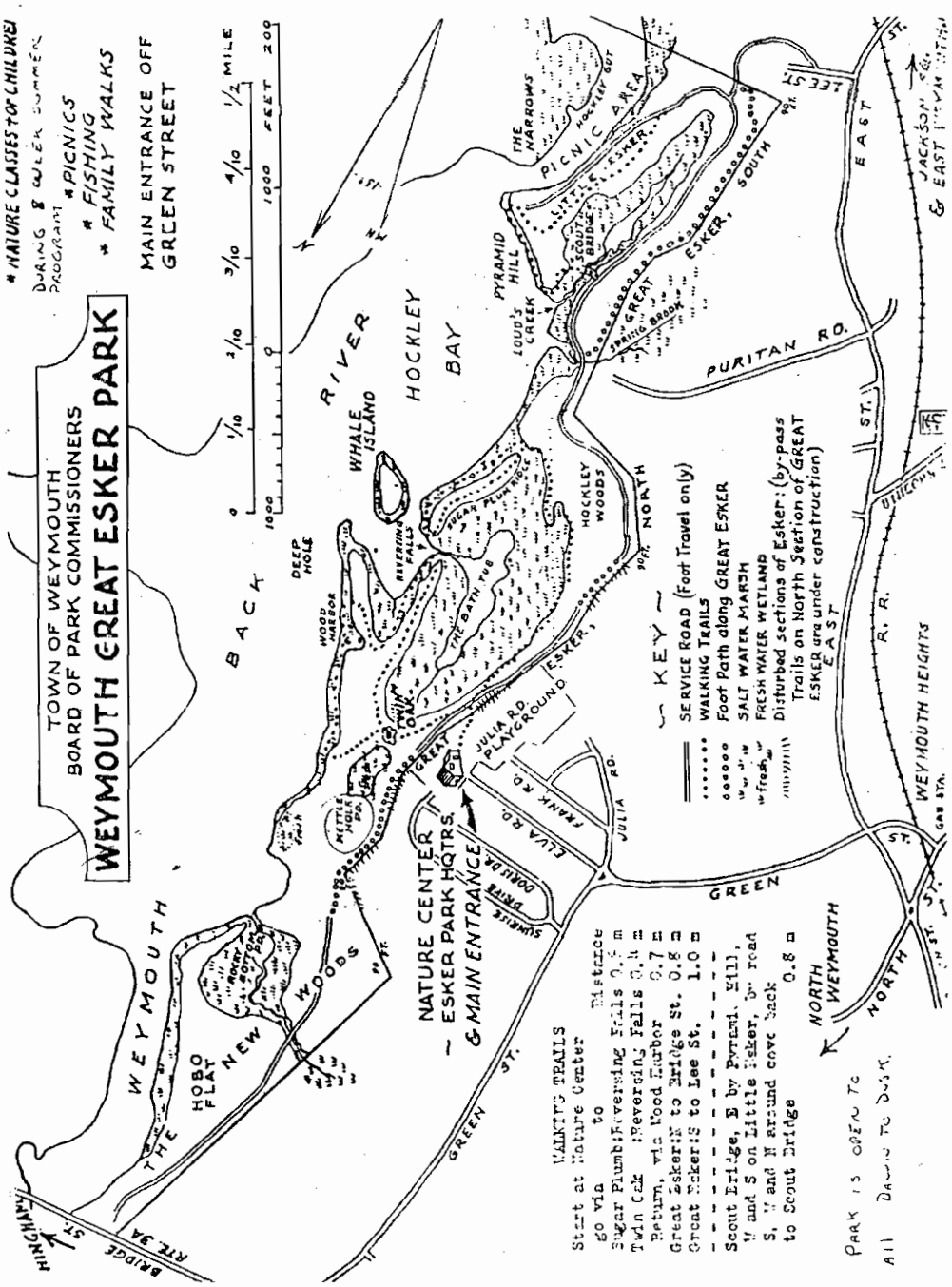
12.16: Severability

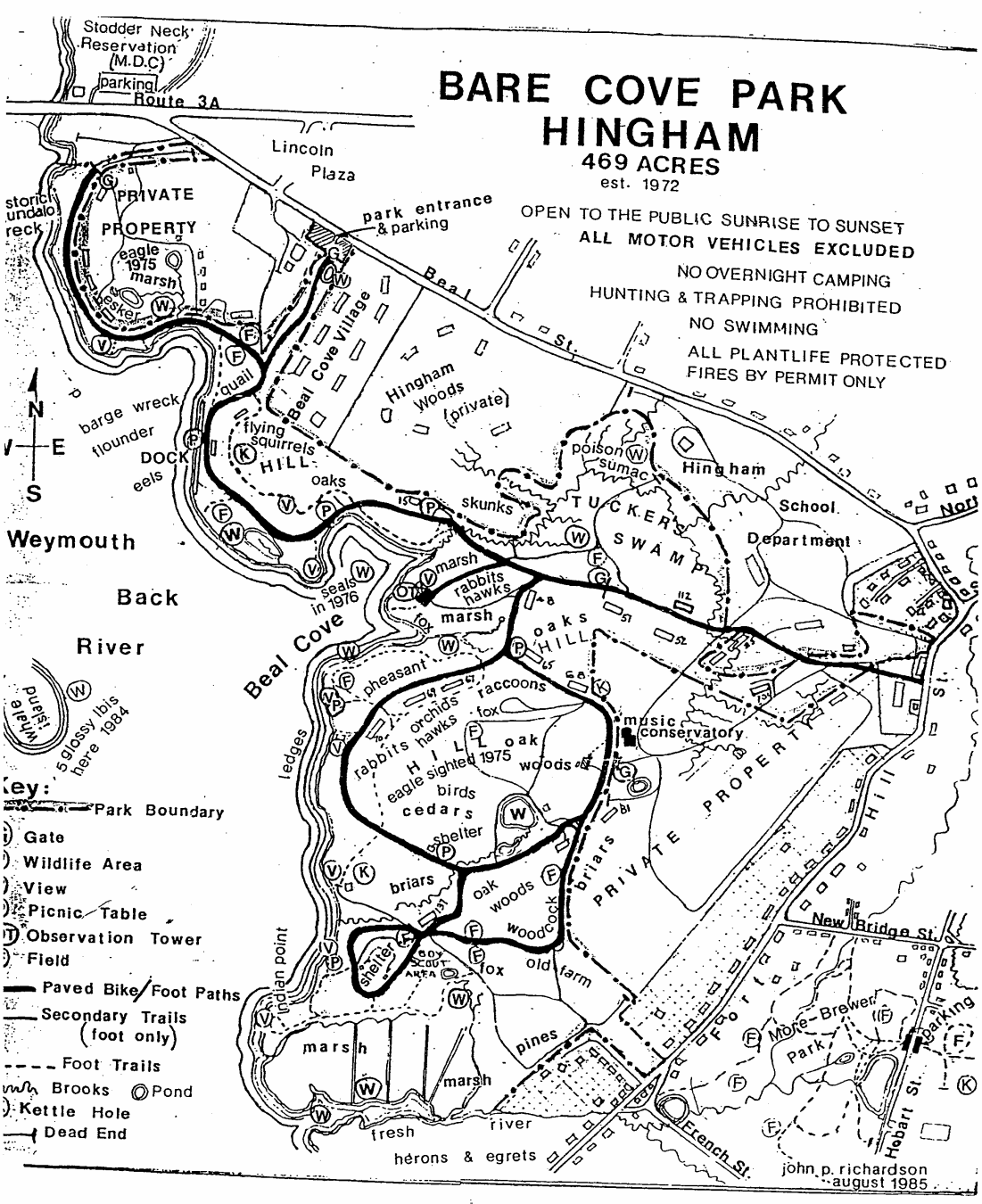
If any provision of these regulations (301 CMR 12.00 through 12.16) or the application thereof is held to be invalid by a court of competent jurisdiction, such invalidity shall not affect other provisions or the application of any part of these regulations not specifically held invalid, and to this end the provisions of these regulations thereof are declared to be severable.

REGULATORY AUTHORITY

301 CMR 12.00: M.G.L. c. 21A, s. 2(7); St. 1974, c. 806, s. 40(e)

APPENDIX VII - MAPS : WEYMOUTH GREAT ESKER PARK
HINGHAM BARE COVE PARK




BARE COVE PARK
HINGHAM
469 ACRES
est. 1972
OPEN TO THE PUBLIC SUNRISE TO SUNSET
ALL MOTOR VEHICLES EXCLUDED
NO OVERNIGHT CAMPING
HUNTING & TRAPPING PROHIBITED
NO SWIMMING
ALL PLANTLIFE PROTECTED
FIRES BY PERMIT ONLY
Stodder Neck Reservation (M.D.C.)
parking
Route 3A
Lincoln Plaza
park entrance & parking
PRIVATE PROPERTY
eagle 1975
marsh
lobster
quail
Beal Cove Village
Beal St.
Hingham Woods (private)
flying squirrels
HILL
oaks
barge wreck
flounder
DOCK
eels
skunks
poison sumac
TUCKERS SWAMP
Hingham School Department
Weymouth Back River
seals in 1976
marsh
rabbits hawks
Beal Cove
oaks HILL
pheasant
raccoons
orchids
fox
rabbits hawks
HILL
oak
eagle sighted 1975
woods
birds
cedars
shelter
music conservatory
PRIVATE PROPERTY
ledges
briars
oak woods
woodcock
briars
shelter
Eagle Scout AREA
fox
old farm
Indian point
marsh
pines
marsh
fresh river
herons & egrets
New Bridge St.
Fort Hill
More-Brewer Park
parking
Hobart St.
French St.
5 glossy ibis here 1984
Key:
Park Boundary
Gate
Wildlife Area
View
Picnic Table
Observation Tower
Field
Paved Bike/Foot Paths
Secondary Trails (foot only)
Foot Trails
Brooks
Pond
Kettle Hole
Dead End
john p. richardson
august 1985